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MONTANA OUTDOORS

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What do snakes do in the winter?

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Contributions.
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Pulling it all together.

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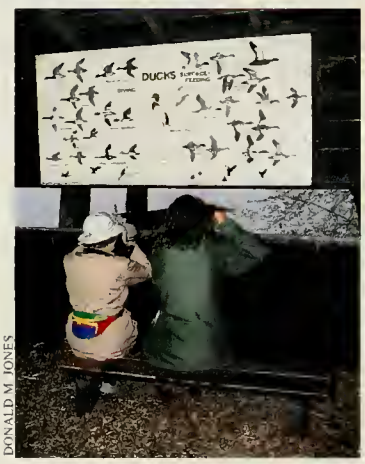
MIKE GURNETT



DONALD M. JONES

So what can you do? You too can connect by volunteering or contributing. There is also a new initiative that seeks to provide a stronger financial base for programs like these. The Wildlife Diversity Funding Initiative (p. 39) seeks to broaden our depth of understanding and strengthen commitments to conservation for wild creatures that are not direct beneficiaries of fees spent by hunters and anglers. Recreation, education, and conservation provide a strong foundation for sustaining wildlife. Let's do something wild.

Patrick J. Graham, Director, Montana Fish, Wildlife & Parks

WELDON LEE

Turn to page 15 for an identification guide to Montana's amphibians and reptiles.

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MIKE GURNETT

Beyond the WATER'S EDGE

by Bruce Auchly

AT 39, KEN VERLANIC had not fished for 30 years. Then, two years ago, the parent from Anaconda relearned the joys of angling from his 7-year-old son, Jim.

"The fishing magazines come in the mail," Ken says, "and he puts them by his bed so he can figure out which lure to buy. He's even got them for fish that don't live around here."

The Verlanics got hooked on angling through a Montana Fish, Wildlife & Parks (FWP) fishing clinic, part of a larger program called "aquatic education." In Montana, fishing clinics are new and attracting most of the attention, but aquatic education means more than just learning how to fish.

It's an 11-year-old in Great Falls tying his first fly, then catching a trout with it on a family outing. It's a high school biology teacher in Miles City getting his students to analyze the Yellowstone River and compare it to the Yellowstone that flows through Gardiner and Billings. And, yes, it's the Verlanics learning to fish together. Aquatic education lets people discover what lies beyond the water's edge.

Whether it's tying flies, studying pond ecology, checking a river's pulse, or teaching kids to fish, aquatic education has rewards for Montanans of all ages.

How that happens depends on the water, the teacher, and the student.

The Verlanics' tale began two years ago when Ken tried to get his son to attend a fishing clinic in Anaconda. "I had to force him to go," Ken says. Clinics are typically an evening or two of instruction and a day of fishing. Now, father can't get son to quit thinking about fishing, even when the pair are doing other things together. "He saw a big brown trout from the duck blind where we were duck hunting," Ken says. "So that's the first place we're going to go when fishing opens up again this spring."

Though Ken enjoys his son's newfound habit, he wasn't really prepared for the strength of the youngster's addiction. "I don't fish," Ken admits. Well, he didn't. He does now. He's even looking forward to attending this year's clinic with his son.

"He'll have even more tales to tell about the big ones that got away," the elder Verlanic says. Or the ones that didn't. Like the time a local lawyer saw the Verlanics' story in the hometown paper covering the fishing clinic. The barrister said not to worry, he'd take the boy fishing. "Well, Jim caught five fish and the attorney didn't catch any," Ken says, laughing.

Pro bono, indeed.

Mark Sweeney loves to hear such stories. That's because Sweeney, who works at FWP's Washoe Park Trout Hatchery in Anaconda, organizes the events the Verlanics attend. "It started out with an open house at the fish hatchery," Sweeney recalls. "That was our first one. There was a big turnout and that got me thinking."

The next year he found a small pond and arranged to have it planted with catchable trout. He didn't consider something as exotic as preregistration. "We were overrun with people," Sweeney says. "It was a gorgeous day and we probably had 200 kids."

Now game wardens join Sweeney at evening classes the week before the early June gathering. Besides allowing Sweeney to count heads before the fishing extravaganza, the evening courses stress water safety, fishing techniques, and fish biology. Of course, the kids attend because they want to fish.

"One year we had a little girl whose mother said she had no idea how to start," Sweeney says. At the pond, mother and daughter fished hard but just weren't catching anything. Then, just as the little girl finally hooked a

trout, a local newspaper photographer showed up. With a snap, a smiling child and slippery fish made news.

"That's what it's all about," says Sweeney.

PERHAPS THAT'S WHAT CONGRESS had in mind when it passed the Sport Fish Restoration Act in 1950, or the amended version in 1984, known as Wallop-Breaux after the two sponsoring congressmen. The original act placed a 10% federal excise tax at the manufacturers' level on fishing rods, reels, lures, and related equipment. The money was given to the states for fisheries management on a three-to-one match. For every dollar spent on a Montana fishing license, the federal government gives the state three dollars.

The Wallop-Breaux amendment expanded the list of taxable items to products like fish finders and motorboat fuel. The 1984 act also increased the range of activities the money could be spent on, like aquatic education.

An early effort at aquatic education, which FWP continues to use, began by duplicating Project WILD, a highly successful wildlife resource for teachers. The curriculum, Aquatic Project WILD, was offered to teachers in training workshops. The idea was to expose teachers to aquatic information they could take back to the classroom.

By the early 1990s, however, it became obvious more was needed. As the Montana Chapter of the American Fisheries Society noted when it unanimously voted to support a larger role for aquatic education in 1991, "The department has active programs in place for hunter education, terrestrial wildlife, boater safety, watchable wildlife...but no program has ever existed in the field of aquatic education."

The current program, including the fishing clinics, began in July of 1993. Up in the Flathead Valley, FWP fishing clinics are all the rage—thanks to local volunteers like Steve McGuire, bass fiend, and Jerry Smalley, trout chaser.

McGuire, sporting goods manager of the Kalispell Kmart, may be the founding father of fishing clinics in Montana. He's been at it for 12 years, even before the term aquatic education was born. "There's some kids you can remember that we now have helping with the clinics," McGuire says. "We now have parents dropping in every year asking, 'When's the fishing clinic?'"

With his Kmart connection, McGuire has youngsters register at his store, and he makes sure the store donates pop and fishing hooks for the event. In addition, he hits up tackle manufacturers for freebies to give to the young anglers. McGuire teaches the gospel of warm water fish, then uses his ties with local bass clubs to net volunteer instructors for the day at the fishing hole—five kids per instructor.

Smalley prefers cold water fish. He relies on 20 years of teaching fly tying at Flathead Community College to instruct youngsters on the intricacies of feathers, floss, and tinsel. "Most of the kids have never tied flies," Smalley says. "They don't have a clue. The whole key is to keep them busy. That means get them doing something."

Aquatic education has caught on across the divide, too. Eleven-year-old Danny Bergstrom attended a fishing clinic last spring at the FWP office in Great Falls. "I thought it would be fun and I'd learn how to fish better," Bergstrom says. Because his parents stress family camping activities, they thought it would be a good idea, too. "We don't do a lot of, 'Let's go fishing,'" says his dad, Jim. "We go camping and take the fishing pole along."

With volunteer help from the Missouri River Fly Fishers, Danny and

Aquatic Education Comes of Age

Aquatic education in Montana covers a host of activities. Much of the funding for these programs stems from a 1984 amendment to the Sport Fish Restoration Act of 1950. Called Wallop-Breaux, the amendment expanded the federal excise tax program on fishing and fishing-related equipment that historically has augmented state fisheries management efforts. Thanks largely to Wallop-Breaux, during the past two years FWP has:

- Conducted more than a dozen angling clinics for young people statewide.
- Helped institute River Watch programs that allow high school students to monitor water quality in the Yellowstone and Flathead river drainages.
- Assisted the American Fisheries Society in producing and distributing an aquatic education poster and educational materials for use in schools and at fishing clinics.
- Produced and distributed a poster identifying fish species found in Montana's ponds and lakes.
- Distributed more than 500 copies of the agency's latest film documentary, *Three Men, Three Rivers*, to school libraries across the state.
- Assisted in putting together a 16-page insert on aquatic education for *Falcon*, a youth magazine featuring natural history topics.
- Co-sponsored "Fishing Without Barriers" instructional clinics in the Missoula and Kalispell regions for anglers with disabilities.
- Conducted interpretive projects at hatcheries to educate increasing numbers of Montanans about the benefits of healthy aquatic environments.

MIKE GURNETT

Fly tying (left) and water quality sampling (below) are just a few of the activities offered through Montana's aquatic education programs. For more information, contact your nearest Montana Fish, Wildlife & Parks office.

17 other youngsters learned to tie Woolly Worms. The next weekend, while fishing a stream in the Little Belt Mountains, Danny caught three brook trout on his flies.

Getting youngsters into fishing ranks high in aquatic education, but the program has other features as well. Along the Yellowstone River, high school students from Gardiner, where the river enters Montana, to Fairview, 455 miles away on the North Dakota border, participate in a program called River Watch. All the students run a series of tests on the same day to check the river's quality. It makes the young scientists think about the whole river, not just the part that goes through their town.

"The kids down here know what a paddlefish is," says Miles City biology teacher Jamie Ogolin. "But in Gardiner they probably think it's an ocean fish." Ogolin has his juniors and seniors test the river twice a year, spring and fall. The classes run several tests, ranging from simply taking the river's temperature and pH to checking the biochemical oxygen demand, which looks at bacteria in the water that might come from wood pulp, meat packing, or sewage treatment plants.

What do they find? Surprise. A clean river. "Students are always surprised at how high the quality of the Yellowstone is here," Ogolin says. "It looks dirty, but that's just silt. As far as pollutants in the water, it's low."

One exercise that always grabs students' interest, says Ogolin, is netting the river for invertebrates, or what nonscientists call bugs. "The variety of insects is probably the high point. And identifying them is a challenge," he says.

But challenges bring rewards. In aquatic education, the rewards range from helping a high school student realize how things that happen 400 miles away can affect the water outside his or her door, to seeing a youngster tie his first fly and catch a fish with it, to just remembering what it was like to be young and full of enthusiasm.

Or as born-again angler Ken Verlanic puts it, "It's better than staying home and being a couch potato." ■

JAMIE OGOLIN

SUSAN SMETANA

Fishing the Opener

Early season flyfishing may not be easy, but the right tactics can put trout in your net.

by DAVE CARTY

ALL TOO OFTEN, opening day of trout season is embraced with a mixture of excitement and dread—excitement because it is, after all, the first day of the season, and dread because of the drawbacks usually associated with that particular date: high, roily water, sluggish fish, and crowds.

But, although you can't control water conditions or crowds, you can control where and how you fish.

That, at least, is the game plan of the two fishermen interviewed for this story. Al Troth, the inventor of the Elk Hair Caddis, hails from Dillon, and finds fishing on and around opening day some of the more productive of the year. Craig Janssen, a sometimes guide and full-time fly-shop employee in Bozeman, also loves fishing spring fishing—but has developed his own methods, techniques honed by hundreds of days on the water.

Although a few western states—Colorado is one—have seasons that remain open year-round, most Montana streams open on the third Saturday in May. Many of the more famous fisheries—the Madison, Big Horn, and Missouri, for instance—are open year-round. Avoiding opening-day crowds can be as simple as fishing these rivers early and avoiding the crush by staying home when the general season opens later on. As a rule, the larger the river, the more crowded it is likely to be.

Where you fish is up to you. "At that time of year, it's more what you're in the mood for," Janssen says. "A lot of time I fish the bigger stuff because you have a better chance of catching bigger fish there. But if you give it too much time, you'll be getting into the beginning of runoff, which is a reason for hitting the little streams that aren't controlled by dams. You know they're not going to last much longer, so I fish them when I can."

Regardless of the size of the stream, depth and water temperature often determine where the trout are living. "It depends on the river or stream you're fishing," Janssen says. "On the upper Big Horn or Missouri, for instance, [the fish] can really be a lot of places. On a smaller stream, you'll want to fish the deeper spots—the prime lies, the places where the fish are still pretty tightly packed."

Although he lives in a separate mountain valley, Al Troth fishes in similar areas when flows are chilly. "Opening day fishing, or any fishing around that time of year, doesn't always mean high, muddy water," he says. "On the Yellowstone, for instance, the river in early spring is often low and clear. Because of that, the fish will move into real quiet, slow water. I think that the darkness or volume of water makes a lot of difference in the security the trout feel."

Troth claims that fishing for trout in such areas can be productive, but that many anglers quit too soon. "If you get into a nice, deep holding spot and catch a couple fish, chances are there's more than a couple trout there," he says. "The more time you spend, the more you'll catch—if you rest them now and then. I've watched guys come in and fish a hole and catch two or three trout, and then fish and fish and fish and never catch another one. But I'll make a few casts, catch a few fish, and then sit down and rest them, give them a chance to quiet down a little bit, before casting again."

By and large, both men fish deep early in the year, and Janssen, at least,

AL TROTH

favors tandem rigs. "Ninety-nine point nine percent of the time I fish two flies, whether they're dry flies or nymphs," he says. "For fishing at that time of year, normally I tie a small nymph to the tag of the blood knot above the tippet, then a bigger, heavier nymph on the end of the tippet. For instance, I'll use a small Serendipity on the blood knot and a big bead-head nymph or small Woolly Bugger below it." Pools and deep runs should be worked carefully. If the water is cold, the fish, at least those in rivers not controlled by dams, will still be schooled in the pools they spent the winter in.

Unlike some anglers, Janssen is no fan of sinking lines. "I've always figured you can get your fly down deeper and faster and control it better using split shot and monofilament," he says. He uses a long leader, usually nine or ten feet in length, which he fishes with an eight-and-a-half or nine-foot, five-weight rod. Like nearly all anglers these days, he uses a strike indicator, and emphasizes that an angler should remember to slide his indicator up and down the leader as the depth of the water he's working changes.

Although those fishing the Big Horn or Madison may not have to worry about off-color water often, the rest of us do. As any fisherman who has lived in Montana will tell you, monsoon-like spring rains and snowstorms can blow out rivers for days or even weeks at a time. Under such conditions, fishing with flies is trying, at best.

But it can be done. Troth, who is nothing if not dedicated, fishes areas where the current slows and the sediment has begun to settle out of the water. "I've fished some rivers that were in flood stage, pretty nearly," he says. "But I've got into back eddies and found fish that were very responsive to wet flies and occasionally even dries. They were in places that you would never, ever fish—except in high water or in almost flood-like conditions." These areas include the first few inches of shoreline, where friction from the bank slows the current, allowing partial clearing. Typically, he says, the fish hold tightly against shore, and casts must be right on the money.

In May, certain small streams—spring creeks are a good example—may hold spawning rainbows or holdover browns that are large way out of proportion to the size of the water they're living in. Years ago, shortly after moving to Montana from Pennsylvania, Troth was given access to a small, private spring creek with two of his friends. "They were bait fishermen, so one of them ran for one hole, and the other ran for another, and neither one bothered with me a bit," he recalls. "I tied on a great big gray muskrat nymph and walked upstream in water that looked about shin deep, with cutbanks that didn't look too productive. On my

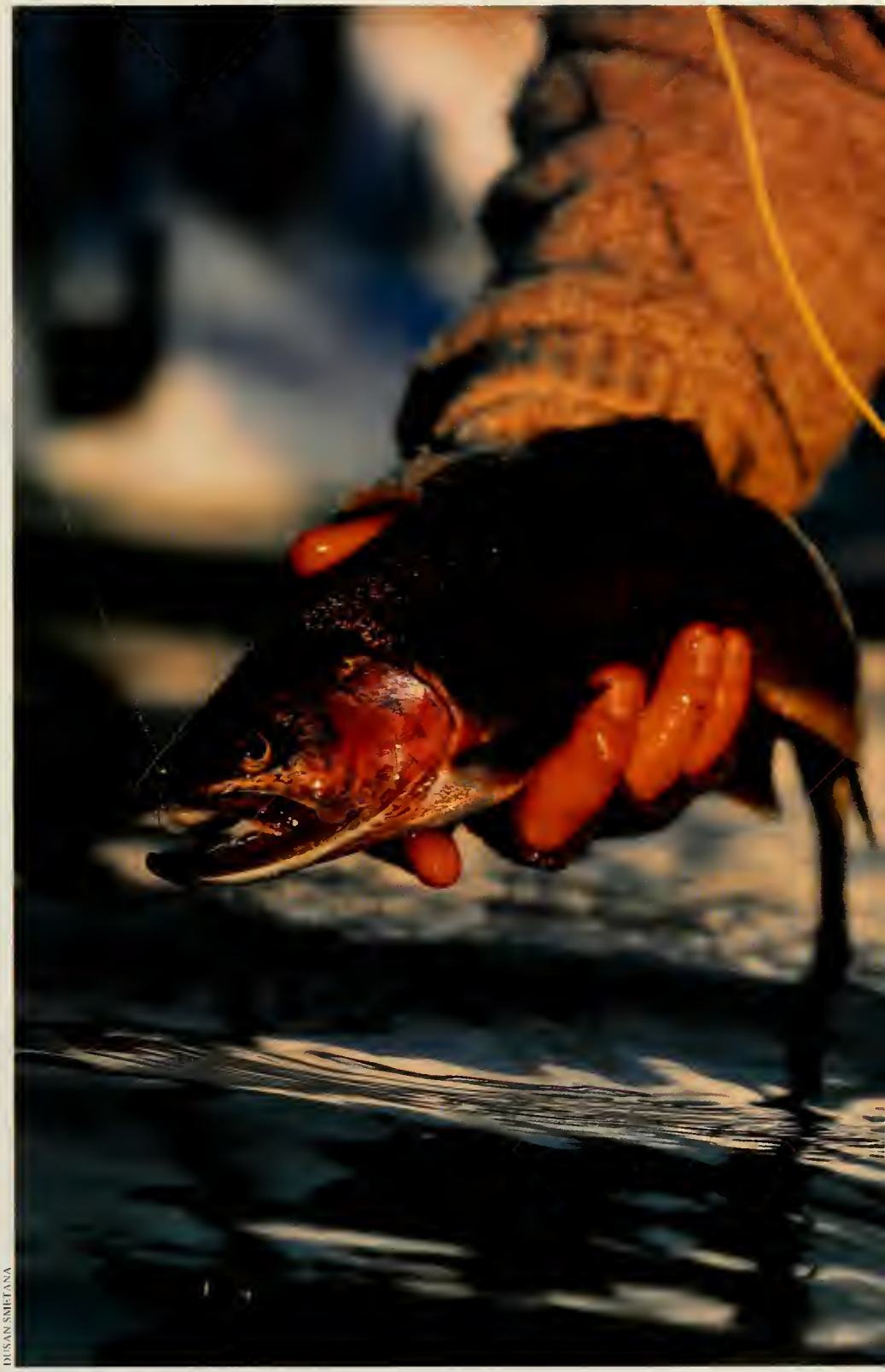
MILO BURCHAM

first cast to a bank, my line stopped, and what I thought was a snag turned out to be a 4-1/2 pound brown trout. At the next bank, I caught one that was 4-1/4 pounds. I couldn't believe it. I'd never taken such big fish from such dinky-looking water before, but the water was evidently deep enough to hide the trout."

Not all opening-day trout are caught on nymphs. There's a surprising abundance of hatches that come off from late May on. "On the right day and under the right conditions, you can get some good *Baetis* hatches and also some excellent midging, even on the freestone streams," Janssen says. "That's not typically what you'd expect, but it can happen." For midge patterns, Janssen recommends the Griffith's Gnat. "You can use a million different patterns," he says, "and they may do as well as the Griffith's Gnat, but very seldom do they do better. It's an old standby you have to keep around. For *Baetis* imitations, I use a Parachute Adams more than anything, usually in sizes sixteen to twenty."

The best dry-fly action usually takes place on cloudy days or on sunny days in shady locations. "As soon as the sun drops over the hill, the surface (midge) activity starts," Troth says. "I think the delay is due to the low flows on some rivers at that time of year and the lack of aquatic vegetation that helps hide the fish. The fish feel insecure moving out into shallow areas in bright sunlight."

Although rivers are usually low and clear on opening day, there are no guarantees. Furthermore, hatches can come and go. Troth says every characteristic of a trout stream is specific to that stream, and that there's no substitute for knowing the water you fish. Sound like work? Not really. Your research will take place on the river, with a flyrod in hand. ■



DUSAN SMETANA

Have Secchi Disk, Will Travel

by JOHN FRALEY

LIKE SUNFISH introduced into a warm, productive pond, a new volunteer spirit is growing and thriving in Montana's lakes and streams. Part of a nationwide effort spawned by the 1972 Clear Water Act, Montana's volunteer lake monitoring program is relatively new but quickly gathering momentum. Many people believe it is already equal to some of the best.

The program, which includes more than 600 individual projects in 46 states, has been an information bonanza for government water quality experts. In Montana, citizens monitor variables like total phosphorus content, water temperature, water transparency, and chlorophyll-*a* (an index of algae density) on more than 100 lakes ranging in size from a few acres to Flathead Lake and Canyon Ferry Reservoir.

"That's excellent on a darn small budget," says Loren Bahls, the Montana Clean Lakes Coordinator for the Department of Health and Environmental Sciences in Helena. Bahls uses data collected by volunteers in the biennial reports his division submits to the Environmental Protection Agency (EPA). "I'd say that it amounts to 99 percent of the new lake data we get," he adds.

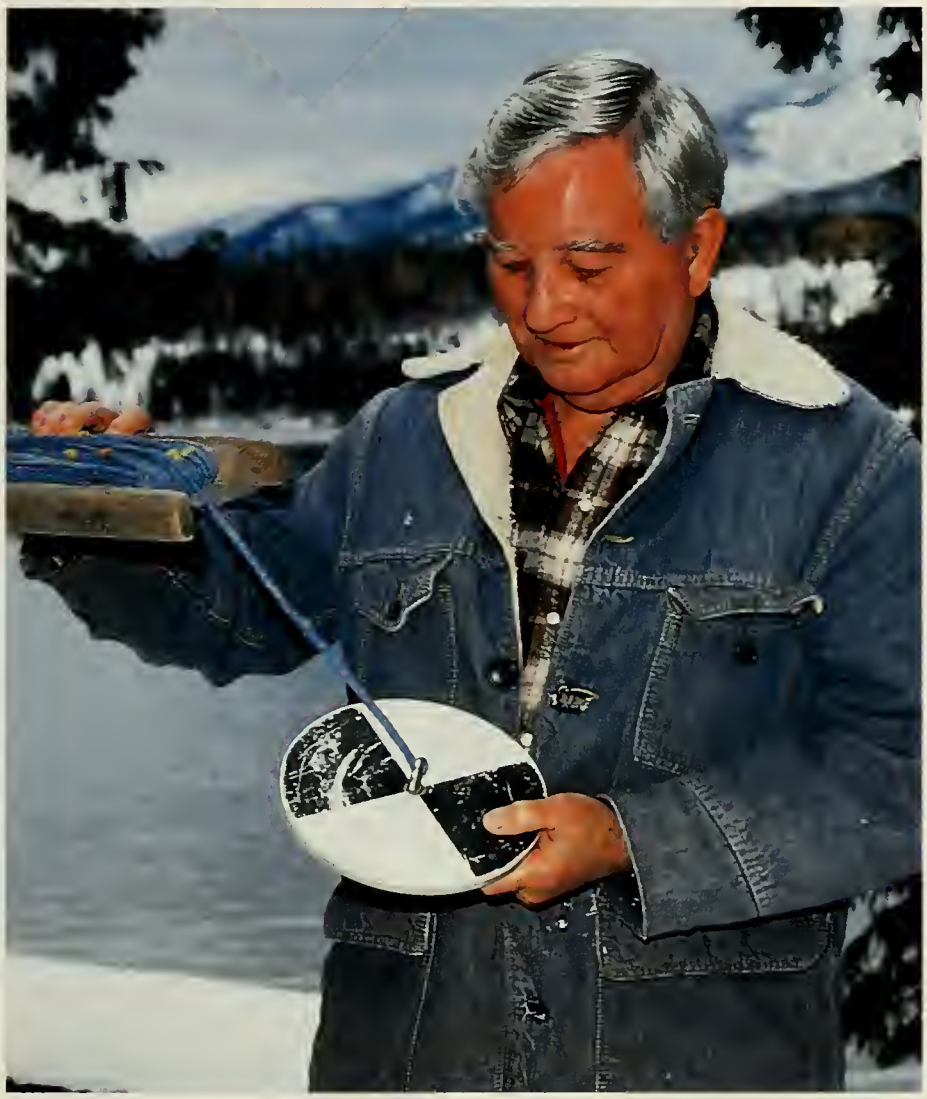
Volunteer lake monitoring in Montana is coordinated by several entities. The Flathead Basin Commission oversees monitoring of about 40 sites in more than 20 lakes in the Flathead watershed. The commission's public information officer, Mark Holston, is enthusiastic about what has been accomplished. "We've trained over 75 volunteer monitors and we're really only entering our third year," says Holston. "These folks are highly motivated. In collecting the data they've developed a stronger sense of stewardship—we all see a bigger picture now than we've seen before."

Holston adds that grants from the EPA and Coors, Inc. have made it possible to buy monitoring equipment, hire a summer intern, and provide periodic training for the volunteers. "This is a quality program," he says. "These volunteers are part of a national effort, from Maine to California, all measuring the same things and using the highest standards. The EPA uses the information to check the pulse of water quality in local areas."

Montana Fish, Wildlife & Parks (FWP), in close coordination with the Flathead Basin Commission, oversees volunteer monitoring of northwestern Montana lakes outside the Flathead drainage. A dozen citizens monitor water quality factors in 15 lakes in the Kootenai, Thompson, and other river drainages.

MARK HOLSTON

Flathead Basin Commission volunteer coordinator Lynda Holmquist and volunteer Kevin McDonough at work on Skyles Lake.



JOHN PRALEY

Paul Mooring with the Secchi disk he uses to monitor water quality in Swan Lake.

"These volunteers have become a real asset for the state," says John Wachsmuth, a fisheries technician who coordinates the program for FWP out of the Kalispell (Region 1) headquarters. "With limited budgets they've added many extra hands to the effort."

According to Wachsmuth, the commitment volunteers have shown is vital to the program's success. "This isn't a one-year operation," he says. "It will be years before we see significant benefits. But this information over the long run will be of high enough quality to be used by our agency, the state's Water Quality Division, and the National Clean Lakes Program."

Volunteer lake monitoring on 54 lakes in areas outside northwestern Montana is coordinated by Gil and Marilyn Alexander of the Canyon Ferry Limnological Institute. Marilyn Alexander believes that a growing awareness about water quality in Montana is driving the rapid increase they are seeing in their program. "People used to believe that there was just lots of water and quality wasn't a problem," she says. "Now more and more people are realizing that the quality of our water is really, really important."

"The greatest benefit of this program is the stewardship it encourages. It gets people involved in their lakes."

Alexander sees the program as a way of establishing an information baseline for lakes that would get no attention from government agencies because of limited funds. The Alexanders, both teachers in the Helena area, have made a special effort to involve students in the program to foster in them a sense of community involvement and service.

One of the high school students in their program, Chris Lehfeldt of Lavina, periodically monitors water quality on Deadman's Basin Reservoir near Ryegate. Like the other volunteers, he measures water transparency by lowering a black-and-white-colored "Secchi disk" into the water and noting the depth at which it disappears. Lehfeldt is following an old tradition. In 1865, an Italian named Secchi devised the technique to measure the transparency of the Mediterranean Sea. Today, scientists use Secchi disk readings to indicate algae blooms, lake turbidity, and general lake productivity.

In addition to taking Secchi disk readings, Lehfeldt records water temperature and lake conditions, and filters water for the chlorophyll-*a* test. But to accomplish the sampling, Chris does something unusual: In addition to hauling his sampling equipment 23 miles to the lake, he takes several young 4-H'ers along, too. "The kids love it," he says. "They especially like to pump the water through the filters for the chlorophyll test." Chris was inspired to get involved in the monitoring program while attending a three-week science research camp at the Canyon Ferry Limnological Institute.

Opposite: Warren Illi checks the water temperature in Loon Lake, one of the Thompson Chain of Lakes. Below: Chris Lehfeldt (right), assisted by two 4-H'ers, takes water measurements in Deadman's Basin Reservoir near Ryegate.

JOHN FRALEY

THE MORE THAN 100 volunteers who make up Montana's lake monitoring corps range in age from teenagers like Chris Lehfeldt to retirees like Paul Mooring. Mooring, a former child heart specialist and medical school professor, has measured water quality on 8-mile-long Swan Lake in northwestern Montana for more than two years. His enthusiasm has spread to other lakeshore residents, and five people now help him check several stations on the lake. Residents of the lake have a compelling reason to be concerned about the quality of the water—they drink it.

"Everyone who lives on this lake is extremely concerned about water quality," says Mooring, who is assisted in his monitoring efforts by his wife, LaVon. "We draw our drinking water from the lake and pass it through fine-mesh filters to remove particulate matter and some of the bacteria, then through ultraviolet light to kill whatever is left. If we have a water quality problem it will affect us very directly."

COURTESY OF CANYON FERRY LIMNOLOGICAL INSTITUTE

Mooring is seeking funds to add more tests—like one that would detect *E. coli* bacteria—to the monitoring program to get a better baseline picture of the lake. He and other lake residents are concerned about the influence of septic tanks as more people build along the shoreline. "I view this as doing my bit to help protect this beautiful lake," he says. "If water quality problems develop we'll have the information to show it and hopefully be able to do something about it. Everyone should volunteer to do something to help the community. If you complain about high taxes, one way to alleviate them is to volunteer."

Another volunteer, Warren Illi, monitors Loon, Lavon, and Horseshoe lakes in the Thompson Chain of Lakes. Illi, a retired timber officer with the U.S. Forest Service, is involved because of his intense curiosity and the ownership he feels in the lake chain. "I like statistics," says Illi. "When the neighbors say, 'Well, I think the water level is lower than last year,' or 'The water is cleaner this year,' I like to know exactly rather than speculate."

Illi is a charter member of the volunteer lake monitoring corps. He was instrumental in promoting public awareness of the lake chain and he encouraged other lakeshore homeowners to take on the water quality monitoring of nine lakes. "Water quality was a big part of the Chain of Lakes management plan, but no funds were available," he says. "This volunteer effort was the perfect solution."

Illi and other homeowners monitor the lakes on which their homes and cabins are located. In addition, Illi hooks up a boat and trailer to monitor two additional lakes. He even monitored water temperatures on one lake for two years before the official program began.

Monitoring biweekly, says Illi, as he does on Loon Lake, can yield valuable data that might be overlooked with monthly measurements. One summer, he found a two-fold change in water clarity between three biweekly measurements on the lake. "The Secchi disk reading went from 30 feet to 17 feet, then back to 30 feet in three consecutive sampling periods," he says. "The change probably indicates an algae bloom that would have been missed with monthly sampling." In water quality monitoring, as in an Agatha Christie mystery novel, facts collected methodically and viewed over a period of time usually reveal and explain important events.

Terry Divoky, a teacher in Columbia Falls, has been involved in the lake monitoring program from its inception. She uses a canoe to sample Half Moon Lake. "I live along the lake and I want to help make sure it stays nice, so part of my motivation is selfish," she says.

In addition to recording temperature and water transparency, Divoky makes detailed natural history notes about nesting of geese, ospreys, and other birds, and lake and weather conditions. "It has really improved my observation skills. There are a lot of things about the lake I would never have thought to look at without going through the data form."

Another teacher, Scott Gaiser, integrates lake monitoring in the spring and fall into an educational experience for his students at Eagle Alternative High School in Coram. "The kids really get into it," he says. "I was looking for hands-on science activities for my students and limnology is my area of interest. The key is that it gets the students involved in a worthwhile activity to help the environment. At the same time, they can pop the data into the computer, do some graphing, and tie things together."

High school teacher Leanne Hennessey of Livingston monitors water quality in the Livingston Lagoon, a channel of the Yellowstone River dammed and excavated by the Army Corps of Engineers to form a park pond. She uses comparisons between the lagoon and the nearby Yellowstone

Volunteer Monitoring on Montana's Streams and Rivers

In addition to the lake monitoring program, Montana has an active citizen water quality monitoring program for flowing waters. These "River Watch" programs, organized under the Water Monitoring Coalition (below), emphasize student involvement and concentrate on the Yellowstone, Missouri, Bitterroot, Flathead, and Kootenai drainages. The Water Monitoring Coalition seeks to involve Montana students and teachers in the study of stream ecology and monitoring, and to promote standard methods and information sharing. As in the lake monitoring programs, volunteers measure water chemistry and physical variables. Another important component is the study of aquatic macroinvertebrates living among the stream bottom rocks and silt. Monitors collect the bugs, place them in categories, and come up with an index that indicates water quality relative to other streams.

For more information on these flowing water programs, contact John Etgen, Montana Watercourse/ Project Wet; 201 Culbertson; Montana State University; Bozeman, MT 59717; (406) 994-5392.

The Water Monitoring Coalition:

- Bitterroot Monitoring Project—T. A. Hennard, Corvallis; (406) 961-3201. Now in its second year, the Bitterroot Monitoring Project is a cooperative effort between Corvallis High School and the Teller Wildlife Refuge. Students are monitoring water quality on four stream sites on the refuge and two sites on the Bitterroot River.

- Yellowstone River Watch—John Miller, Billings; (406) 655-3101. The Yellowstone River Watch began in the spring of 1994. Students from 15 schools along the Yellowstone River from Gardiner to Sidney have set up permanent test sites and are conducting fall and spring monitoring.

- Project FREEFLOW, Flathead River System—Susan How and Don Slaybaugh, Kalispell; (406) 257-2301. Project FREEFLOW began during the 1994-95 school year. Students in grades 7-12 from 20 schools in the Flathead River Basin are collecting data on streams and rivers three times per year.

- Kootenai River Network—Jill Davies, Libby; (406) 847-2228. The Kootenai River Network's Adopt-A-Stream Project is providing training and support for citizen volunteers and teachers who are interested in adopting and monitoring a stream within the basin.

- Missouri River Water Quality Network—Gil and Marilyn Alexander, Helena; (406) 475-3638. Up to 2,000 Montana students in grades K-12 are monitoring streams in the Missouri River Basin four times per year (September, November, March, and May).

River to illustrate to her students differences in aquatic environments. Students measure oxygen levels, algae, and macroinvertebrates (primarily aquatic insects) in the two systems. "It's a great way for them to study differences in the ecology of standing versus flowing water," says Hennessey.

It's hard to estimate the full value of Montana's lake monitoring effort. As Loren Bahls notes, in addition to establishing a water quality baseline on more than 100 lakes, the program will help his agency classify the lakes as to their "trophic status," or level of productivity or pristineness. According to Bahls, measurements of total phosphorus, chlorophyll-*a*, and water transparency can be plugged into an EPA formula to rank Montana's lakes relative to other lakes across the country. Bahls is quick to point out that the information collected can't be used for regulation or enforcement because it's not tied to any specific pollution source.

"The greatest benefit in this program is the stewardship it encourages and the educational value to the community," Bahls says. "To me, that far outstrips the value of the data. It gets people involved in their lakes." FWP's Wachsmuth agrees: "It empowers people to become more active and gives them a sense of ownership in the health of their lakes."

COURTESY OF CANYON FERRY LIMNOLOGICAL INSTITUTE

Livingston high school teacher Leanne Hennessey uses water quality exercises to teach principles of aquatic ecology.

Bahls and Marilyn Alexander both point out that some funding is required for the program, noting that a single laboratory analysis for chlorophyll-*a* or total phosphorus costs $25.00 or more. They are concerned that EPA faces a budget cut that will limit the program.

All the coordinators agree that more volunteers are needed. According to Bahls, Montana has more than 7,000 lakes five acres or greater in size that potentially could be monitored. That means only a small fraction of Montana's lakes are currently in the program.

"We have over 500 lakes in the Flathead Basin alone," says Mark Holston. "The potential for expanding the program is limited only by our ability to find motivated people."

As in most successful volunteer efforts, the enthusiasm of the participants in the lake monitoring program is vital to success. "These folks have been an inspiration to me," Holston says. "One guy loads up a boat he made himself and travels to sample lakes. That level of sacrifice is truly exceptional." ■

MARK HOLSTON

For more information about Montana's volunteer lake monitoring program, contact:

For general information—Loren Bahls, Coordinator; Montana Clean Lakes Program; DHES Water Quality Division; P.O. Box 200901; Helena, MT 59620-0901; (406) 444-2406.

In the Flathead drainage—Mark Holston; Flathead Basin Commission; 723 Fifth Ave. East; Kalispell, MT 59901; (406) 752-0081.

In northwestern Montana outside the Flathead—John Wachsmuth; Montana Fish, Wildlife & Parks; 490 North Meridian Road; Kalispell, MT 59901; (406) 752-5501.

In the remainder of Montana—Gil and Marilyn Alexander; Canyon Ferry Limnological Institute; 7653 Canyon Ferry Road; Helena, MT 59602; (406) 475-3638.

Herpetology is the study of amphibians and reptiles. The word is Greek in origin and means "the study of creeping things." While many of us may fondly remember catching amphibians (frogs, toads, and salamanders) as children, we are more likely to think of reptiles—especially snakes—with fascination or even fear.

Identification of Montana's

AMPHIBIANS AND REPTILES

by Jim Reichel and Dennis Flath

MICHAEL J. WOLF

Amphibians and reptiles are called "cold-blooded" because, unlike mammals and birds, they do not produce enough metabolic heat to maintain body temperatures higher than their environment (it is interesting to note, however, that some dinosaurs probably did). Instead, amphibians and reptiles use variations in the temperature of their surroundings to adjust their "thermostat" to an ideal setting for their current activity. For example, they may lie in the sun or on warm rocks when preparing to hunt. In fact, snakes may expose only a portion of their body to the sun to increase digestion while keeping the rest of their body cool to conserve energy.

This inability to generate sufficient metabolic heat to maintain a high body temperature, coupled with restricted mobility, means that all amphibians and reptiles in Montana must hibernate in winter. While their dependence on the temperature of the environment prevents them from using some habitats, it also confers an important advantage: they require only a tenth to a fiftieth the energy needed by similar-sized mammals.

While the descriptions and ecological information in this identification guide will help you to better understand Montana's reptiles and amphibians, much remains to be learned about these unique creatures. Population trends, reproductive behavior, and distribution are not well known in all cases. You can contribute to our knowledge of this fascinating segment of Montana's fauna by reporting your observations (with date and location) to the Montana Natural Heritage Program (P.O. Box 201800, Helena, MT 59620-1800) or the Nongame Program of Montana Fish, Wildlife and Parks (FWP Building, MSU Campus, Bozeman, MT 59717-0322).

We would like to thank Dr. Chuck Peterson, Idaho State University; Dr. Kirwin Werner, Salish Kootenai College; and Dr. Richard Franz, University of Florida, for reviewing the article.

AMPHIBIANS

Amphibians were the first vertebrates to live on land. Several characteristics define this group of animals, including metamorphosis, eggs, skin, and respiration. The word "amphibia" means "double life" and refers to the life history of the group. While adults are often found on land, most lay eggs in the water. The eggs hatch into tadpoles or larvae that appear quite different from adults. The tadpoles or larvae undergo profound, rapid body changes called metamorphosis, during which they develop adult characteristics. Amphibians lack the hair, feathers, or scales found in other land animals, and instead have a skin that is moist, glandular, and naked. The moist skin is used extensively for breathing; in fact, the Coeur d'Alene salamander lacks lungs and breathes almost exclusively though its skin. Amphibians do not drink through their mouths, but instead absorb water through their permeable skin. This has drawbacks during dry periods, however, since they can easily die of dehydration unless they can reach water or retreat underground.

MICHAEL J. WOLF

Amphibians lack the hair, feathers, or scales found in other land animals, and instead have a skin that is moist, glandular, and naked.

Amphibians appeared about 360 million years ago and were the dominant animal group on the land for over 150 million years. About 100 species of salamanders and 80 species of frogs and toads are found in the U.S. today, but only 4 salamanders and 10 to 11 frogs and toads are native to Montana.

Why are amphibians important? With more than 3,000 species found worldwide (compared with 4,000 mammals), they are major components of many ecosystems as both predators and prey. Some, such as larval tiger salamanders, are the top carnivores in their ecosystem and may be "keystone" species. Because amphibians have permeable skin, several phases in their life cycle, and typically spend part of their life cycle in the water and part on land, they serve as early warning systems for ecological decline.

Frogs and toads are the most commonly observed amphibians in Montana. Adults are tailless and have well-developed hind legs for jumping and swimming. There is no major taxonomic division separating frogs and toads, but toads generally have shorter legs and more warts and glands than frogs; for simplicity, we will refer to this group collectively as "frogs."

Frogs emerge from hibernation in spring and move to breeding sites. Males usually arrive first and begin calling to attract a mate. The call of each species is unique and identifiable. Mating takes place in the water, and eggs are laid in globular masses or long strings. Eggs typically have dark centers surrounded by a clear, jelly-like substance and hatch within a few days or weeks. Temperature plays a critical role in egg development; eggs may take up to five times as long to hatch in cold water versus warm. Further, each species has a maximum and minimum temperature at which it can survive.

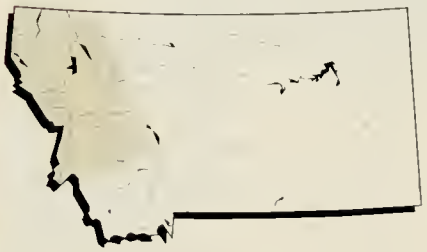
Frog larvae, called tadpoles, differ greatly from adults. They have big, round bodies and long tail fins. Tadpoles grow rear legs first, then front legs. Tadpoles for the most part are vegetarians, but in some species a percentage of the tadpoles become carnivores or even cannibals. These individuals, which grow more rapidly than their brothers and sisters, become bigger and develop large mouths and teeth. The period between hatching and metamorphosis typically lasts 2 to 4 months, but in the tailed frog it may take 4 years. Metamorphosis is dramatic: gills are absorbed and lungs develop; the tail is absorbed; eyelids appear. The horny beak of the plant-eating tadpole is transformed into the gaping mouth of the frog, and with the shift in diet, the digestive system also changes. Frogs typically eat insects and other invertebrates, but large bullfrogs may take small vertebrates.

Salamanders are the other group of amphibians found in Montana. They have gaping mouths, tails, and four legs of approximately the same size. Like frogs, they go to breeding ponds after awakening from hibernation; however, they do not call. Egg masses are similar to those of frogs, but the centers of the eggs are usually yellow rather than black. Larval salamanders look much like scaled-down adults, but they have external gills that are absorbed when metamorphosis is complete.

There are two basic types of salamander larvae in Montana: stream-dwelling (Idaho giant salamander) and pond-dwelling (other species). The stream-dwelling larvae have short gills and tail fins that begin near the rear legs, while pond-dwellers have long, feathery gills and tail fins that begin near the front legs. Both larvae and adults are predators and typically eat small invertebrates such as worms and insects.

LONG-TOED SALAMANDER (*Ambystoma macrodactylum*)

BILL SWANSON



DESCRIPTION: Adults are dark gray to black with an irregular (sometimes broken or rarely absent) green to yellow stripe down the middle of the back. The longest toe on the hind foot is longer than the sole; this species lacks a groove running vertically from the nostril to the mouth. Adult body length is 2 to 3.25 inches. *Eggs and Larvae:* Eggs are typically laid in ponds in small clusters of 5 to 100, but eggs may be laid singly. Larvae are usually brown, have three external gills, and are relatively small (less than 1.75-inch body) and slender.

SIMILAR SPECIES: In Coeur d'Alene salamanders, the longest toe on the hind foot is shorter than the sole; this species also has a yellow throat patch and a groove running vertically from the nostril to the mouth.

HABITAT AND HABITS: Long-toed salamanders are found in a variety of habitats from sagebrush to alpine. They typically breed in ponds or lakes, usually those without fish present. Adults go to the breeding ponds immediately after snowmelt and in western Montana are usually the first amphibians to breed. Like all salamanders, they have internal fertilization. Following breeding, they move to adjacent uplands. Eggs hatch in 3 to 6 weeks and metamorphosis takes 2 to 14 months.

STATUS: The most common salamander in western Montana.

TIGER SALAMANDER (*Ambystoma tigrinum*)

BILL SWANSON

BILL SWANSON

Tiger salamander larva

DESCRIPTION: Adults vary in color pattern, but background color is usually dark, with lighter blotches of yellow, tan, or green. Adults are large and heavy-bodied with a body length of 3 to 6 inches. *Eggs and Larvae:* Eggs are typically laid in small clusters of 5 to 120, but may be laid singly. Larvae are typically pale green or brown. They have external gills and are relatively large and heavy-bodied (0.75 to 4 inches).

SIMILAR SPECIES: Idaho giant salamanders have a more marbled color pattern and a very large head, and lack the two prominent tubercles on the bottom of each hind foot displayed by adult tiger salamanders.

HABITAT AND HABITS: Tiger salamanders in Montana are primarily associated with prairie or agricultural habitats. They breed in ponds, lakes, springs, intermittent streams, and stock ponds, usually those without fish present. Adults go to the breeding ponds soon after snowmelt, after breeding, adults may remain in the ponds or move to upland areas and live in burrows. Eggs hatch in 2 to 5 weeks and metamorphosis takes 2 to 24 months. In some locations larval salamanders never transform, but rather become sexually mature and breed while retaining external gills (referred to as neotony). These salamanders are often called "axolotls" or "water dogs."

STATUS: The most common salamander in eastern Montana.

COEUR D'ALENE SALAMANDER (*Plethodon idahoensis*)

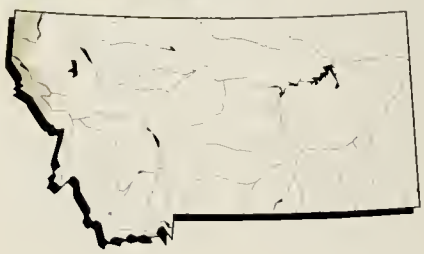
KIRWIN WERNER

DESCRIPTION: Adults are usually dark gray to black with a green, red, yellow, or orange stripe down the middle of the back. The stripe typically has irregular edges, but in some individuals the edges may be even. A yellow throat patch is usually present. Adult body length is 2 to 2.4 inches. These salamanders have relatively long legs, short, stubby toes, and a groove running vertically from the nostril to the mouth (a magnifying glass may be needed to see it). *Eggs and Larvae:* The egg cluster contains 7 to 12 small, yolked eggs and is not laid in the water. There is no larval stage and the newly hatched young resemble the adults in color.

SIMILAR SPECIES: See long-toed salamander

HABITAT AND HABITS: Coeur d'Alene salamanders are the only amphibians in Montana that lay their eggs out of water. Lacking lungs, they breathe through their skin. Found in springs or seeps, waterfall spray zones, and at the edges of streams, they are very habitat-restricted. Nearly all sites have fractured rock formations present, and nearby habitat is typically forested. These salamanders move far down into the spaces between rocks for protection from drying and freezing.

STATUS: Rare and locally distributed in northwestern Montana, though they may be abundant in small pockets.



IDAHO GIANT SALAMANDER (*Dicamptodon aterrimus*)

DESCRIPTION: Adults have light tan or bronze marbling on a dark brown or black background. They are heavy-bodied, with a large head and muscular legs; body length varies from 3.5 to 8 inches. *Eggs and Larvae:* Larvae are identified by their short, bushy, external gills; their large size; a dorsal fin starting at or behind the rear limbs; and their stream habitat. Other larval salamanders in Montana live in ponds, have long, feathery gills, and a dorsal fin originating far forward of the rear legs.

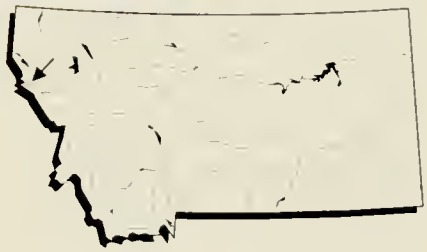
SIMILAR SPECIES: See tiger salamander. The roughskin newt, *Taricha granulosa* (see inset photo), which has been reported near Thompson Falls (possibly introduced), is dark brown above and bright yellowish orange below, with a very grainy skin.

HABITAT AND HABITS: Transformed adults, although seldom seen, inhabit moist coniferous forests where they may be found under logs, bark, or rocks. They are most active on warm, rainy nights. Larvae are usually found in swift, cold mountain streams but may occasionally be found in lakes or ponds. Little is known about reproduction in this species. Like tiger salamanders, Idaho giant salamanders sometimes become sexually mature and breed while still in larval form.

LOWELL DILLER

KRISTI DUROS

Roughskin newt



STATUS: Known from only two locations in western Montana (but regularly found in Idaho just across the Mineral County line).

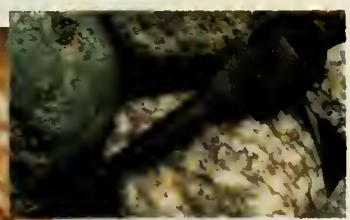
TAILED FROG (*Ascaphus truei*)

DESCRIPTION: Adults are gray or brown with gray, brown, or occasionally yellow blotches; the skin has a distinctly bumpy texture. Adult body length is 1.5 to 2 inches. The outer toe of the hind foot is broader than the other toes. Tailed frogs have no external ear drum. The male has a bulbous "tail" that acts as a penis. *Eggs and Tadpoles:* Approximately 50 eggs are laid in rosary-like strings attached to the underside of rocks. The tadpole (up to 2 inches long) is unique in that it has a large mouth modified into a sucker; color is variable.

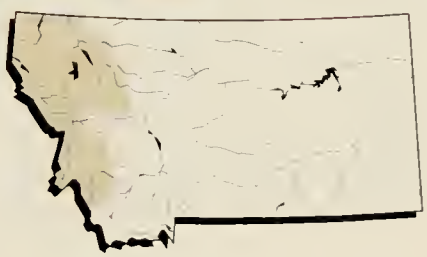
SIMILAR SPECIES: No other frog or toad has the outer toe of the hind foot broader than the other toes; all other frogs and toads have external ear drums.

HABITAT AND HABITS: Tailed frogs are found in and along small, swift, cold mountain streams. Eggs are laid during late summer and take approximately 4 weeks to hatch. Tadpoles take 1 to 4 years to metamorphose, depending on water temperature. Sexual maturity in Montana is attained at 6 or 7 years of age (the latest of any North American amphibian).

BILL SWANSON


KLAUS O RICHTER

Tailed frog tadpole



STATUS: Apparently common in suitable habitat in western Montana.

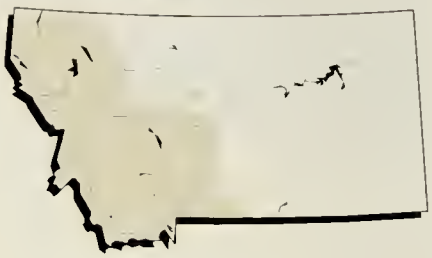
WESTERN TOAD (*Bufo boreas*)

CHARLES R. PETERSON

DESCRIPTION: Adults are gray, brown, or olive green with a prominent white or yellowish line down the center of the back (in very young transformed toads the dorsal line is typically lacking and the warts are often reddish brown in color). Adult body length is 2.5 to 5 inches. There are no cranial crests (ridges running between the eyes) and the dry skin has many warts and glands. The pupils are horizontal. Adults have two black tubercles on each hind foot. *Eggs and Tadpoles:* Tadpoles are typically jet black (tadpoles of Montana frog species are green or bronze except in the tailed frog). Eggs are laid in long, clear, double strings; each egg has a black center.

SIMILAR SPECIES: Other Montana toads have cranial crests between their eyes. The plains spadefoot has one tubercle on the sole of each hind foot, a vertical pupil, and smoother skin. *Note:* It is difficult to distinguish among the four Montana toad species in recently transformed toadlets.

HABITAT AND HABITS: Adult western toads are largely terrestrial and found in a variety of habitats from valley bottoms to high elevations; they breed in lakes, ponds, and slow streams, where they prefer shallow areas with mud bottoms. Breeding and egg laying in western Montana usually takes place 1 to 3 months after snowmelt, and tadpoles are typically 2 to 3 months old before they metamorphose. At metamorphosis, hundreds of small toads, many with the tail remnants still present, can be found on the shores of breeding ponds.



STATUS: Once common and widespread in western Montana, but now uncommon and local. Outside of Montana, declines have recently been recorded in Wyoming, Idaho, and Colorado.

GREAT PLAINS TOAD (*Bufo cognatus*)

RICK & NORA BOWERS

DESCRIPTION: Adults have dry skin with small warts. The back is dominated by large, dark, somewhat symmetrical spots surrounded by light edges. Adult body length is 2 to 3.5 inches. Converging V–shaped cranial crests are present between the eyes, and post–orbital crests (ridges behind the eyes) connect to them at a right angle behind the eyes; the post–orbital crests typically touch the parotoid glands (large glands behind the external ear drums). Adults have two black tubercles on each hind foot. *Eggs and Tadpoles:* Similar to the western toad

SIMILAR SPECIES: Other Montana toads lack the somewhat symmetrical spotted pattern on the back. *Note:* It is difficult to distinguish among the four Montana toad species in recently transformed toadlets.

HABITAT AND HABITS: Adult Great Plains toads favor higher elevation grasslands moreso than Woodhouse's toads, which prefer floodplains. They normally breed in temporary ponds resulting from heavy rains or irrigation runoff, or in reservoirs with much fluctuation. They spend much of the year underground and emerge during warm rains.

STATUS: Locally distributed in eastern Montana, with large gaps in known range. Geographic and habitat relationships with other toads in Montana are not well known.

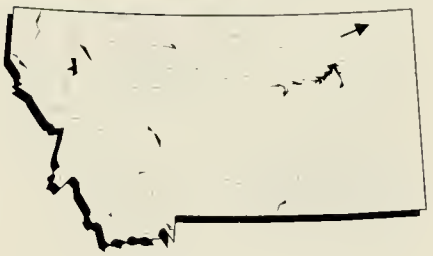
CANADIAN TOAD (*Bufo hemiophrys*)

DESCRIPTION: Adults have dry skin with small warts, and are gray, brown, or olive green with mottling or spots. A somewhat indistinct white or yellowish line runs down the center of the back. Adult body length is 1.5 to 3 inches. Parallel cranial crests are fused into a lump between the eyes; the lump may or may not have a groove in the center. Post-orbital crests behind the eyes are absent or poorly developed. Adults have two black tubercles on each hind foot. *Eggs and Tadpoles:* Similar to the western toad.

SIMILAR SPECIES: The western toad lacks cranial crests. The Great Plains toad has large, white-bordered, dark dorsal blotches. Woodhouse's toad lacks the lump between the eyes, has well developed post-orbital crests, and frequently has its parotoid gland touching the post-orbital crests. *Note:* It is difficult to distinguish among the four Montana toad species in recently transformed toadlets.

HABITAT AND HABITS: Canadian toads prefer prairies and are usually found near water. They burrow extensively and probably require deep, soft soil. Little is known about this species in Montana.

STATUS: Extremely rare in Montana, known from a single site in Daniels County. Nearly extinct in Wyoming. Geographic and habitat relationships with other toads in Montana are not well known.



WOODHOUSE'S TOAD (*Bufo woodhousii*)

Cranial crests

DESCRIPTION: Adults have dry skin with small warts, and are gray, brown, or olive green with paler mottling or spots. A prominent white or yellowish line runs down the center of the back (very young transformed toads typically lack the dorsal line and often have reddish brown warts). Adult body length is 2.5 to 5 inches. Parallel cranial crests are present between the eyes and post-orbital crests connect to them at a right angle behind the eyes; the post-orbital crests typically touch the parotoid glands. If a lump is present on the snout it does not extend back between the eyes. Adults have two black tubercles on each hind foot. *Eggs and Tadpoles:* Similar to the western toad.

SIMILAR SPECIES: The western toad lacks cranial crests. The Great Plains toad has large, white-bordered, dark dorsal blotches. The Canadian toad has a lump between the eyes and frequently has the parotoid gland separate from post-orbital crest, which is often broken. *Note:* It is difficult to distinguish among the four Montana toad species in recently transformed toadlets.

HABITAT AND HABITS: Adults are partially terrestrial but usually found near water; they typically breed in permanent lakes, ponds, reservoirs, and slow streams, where they prefer shallow areas with mud bottoms. They are usually found in irrigated agricultural areas and floodplains. Breeding and egg laying is spread out over spring and early summer.

STATUS: Relatively common in southeastern Montana; status elsewhere in the state unclear. Geographic and habitat relationships with other toads in Montana are not well known.

WESTERN CHORUS FROG (*Pseudacris triseriata*)

RICK & NORA BOWERS

DENNIS FLATH

DESCRIPTION: Adults have tiny, almost unnoticeable toe pads; a dark line extends from the snout through the eye to the groin. Basic coloration varies, with background color green, brown, gray, or reddish. Typically three to five dark longitudinal stripes are present on the head and back; in some individuals the stripes may be broken into spots. Adult body length is 0.75 to 1.5 inches. *Eggs and Tadpoles:* Eggs are laid in clusters of 20 to 100; clusters are usually less than 1 inch across and attached to submerged vegetation. Tadpoles are brown/bronze with eyes located on the sides of the head.

SIMILAR SPECIES: Pacific chorus frogs have obvious toe pads and an eye stripe ending at the shoulder.

HABITAT AND HABITS: Western chorus frogs are regularly found in the water only during the breeding period in spring. They announce their presence this time of year by calling frequently at night and sporadically during the day. Following breeding, they move into adjacent uplands and are rarely seen. In eastern Montana, they breed in temporary ponds and small lakes surrounded by prairie (or occasionally open forest) habitats. Eggs hatch in about 2 weeks and tadpoles take 8 weeks to metamorphose.

STATUS: Common on prairies of eastern Montana.

PACIFIC CHORUS FROG (*Pseudacris regilla*)

MICHAEL J. WOLF

DESCRIPTION: Adults have a dark, conspicuous eye line extending from the nostril to the shoulder. Basic coloration varies, with background color green, brown, gray, reddish, or bronze. Dark spots and stripes are often visible on the head, back, and legs. Most have a dark Y or triangular spot on the head between the eyes. Adult body length is 0.75 to 2 inches. *Eggs and Tadpoles:* Eggs are laid in small clusters of 10 to 70. The tadpoles are brown/bronze with eyes located on the sides of the head.

SIMILAR SPECIES: This is the only frog in Montana with a combination of obvious toe pads and an eye stripe ending at the shoulder.

HABITAT AND HABITS: Pacific chorus frogs are regularly found in the water only during the breeding period in spring. They announce their presence during this time by calling frequently at night and sporadically throughout the day. Following breeding, they move into adjacent uplands and are rarely seen. In western Montana they breed in temporary ponds in lower elevation forests and intermountain valleys shortly after snowmelt. Eggs hatch in 2 to 3 weeks and tadpoles take 8 to 10 weeks to metamorphose.

STATUS: Although little is known about this species, surveys indicate localized distribution over much of western Montana. Whether this has always been the case or whether Pacific chorus frog populations are declining in Montana is currently unclear.

PLAINS SPADEFOOT (*Scaphiopus bombifrons*)

DESCRIPTION: Adults are gray or brown with darker mottling on the back and white on the belly. Some individuals have indistinct longitudinal streaking. Body length is less than 2.5 inches. Adults have a single tubercle on each hind foot and a vertical eye pupil. *Eggs and Tadpoles:* Oval egg masses of 10 to 250 eggs are attached to underwater plants or debris. Tadpoles are mottled sooty and olive yellow above and paler below with gold metallic flecking overall; the iris is gold

SIMILAR SPECIES: Other Montana frogs and toads have round or horizontal pupils. *Note:* The Great Basin spadefoot (*Scaphiopus intermontanus*) is known from southeastern Idaho and may occur in southwestern Montana; it has a low and pliable lump between the eyes, while the plains spadefoot's lump is high and hard.

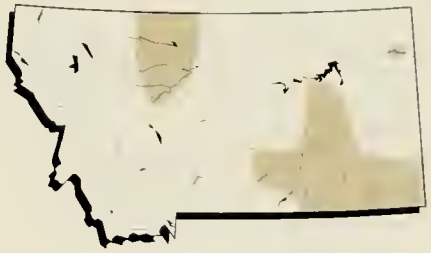
HABITAT AND HABITS: Adults are found in grassland and sagebrush, particularly in areas with sandy or loose soil. They dig their own burrows and may remain underground for a year or more during drought. Plains spadefoots are primarily nocturnal and emerge from their burrows only following heavy rain. They breed in shallow, temporary pools usually following heavy spring or summer rains. Males call loudly, and groups can be heard for up to a mile. Eggs hatch after 2 to 3 days and tadpoles metamorphose in 5 to 10 weeks.

STATUS: Locally common in eastern Montana; there are large gaps in the known range.

DENNIS FLATH

DENNIS FLATH

Tubercle on foot



BULLFROG (*Rana catesbeiana*)

DESCRIPTION: Adults are usually pale to dark green or brownish green with darker spots or blotches above; the underside is cream to yellowish with gray mottling. A series of black bands often extends across the legs. Body length may reach 8 inches. Bullfrogs do not have ridges running along the sides of the back, but have prominent ridges running from the eyes over the external ear drums to the shoulders. *Eggs and Tadpoles:* Egg masses (a one- to two-egg-thick film of thousands of eggs) may reach several feet across. Tadpoles, which grow to a length of 4.5 inches, are olive green with numerous black spots above and white or cream with varying amounts of dark mottling below.

SIMILAR SPECIES: None.

HABITAT AND HABITS: Bullfrogs are rarely seen far from the water's edge and are usually in the water. They are associated with larger bodies of quiet water—e.g., ponds, lakes, or backwaters of streams, usually in areas with extensive cattails or reeds. Their loud, deep "jug o' rum" call can be heard from a considerable distance. Bullfrogs are voracious feeders, eating anything smaller than themselves, including ducklings, fish, mice, frogs, and small turtles. They have been implicated in extirpations of native frogs and turtles, and declines in waterfowl production.

STATUS: Bullfrogs are native to the eastern and central U.S.; introduced into western Montana prior to the 1960s, they are now present along the Flathead and Clark Fork rivers, the Bitterroot Valley, and possibly other locales.

RICK & NORA BOWERS

NORTHERN LEOPARD FROG (*Rana pipiens*)

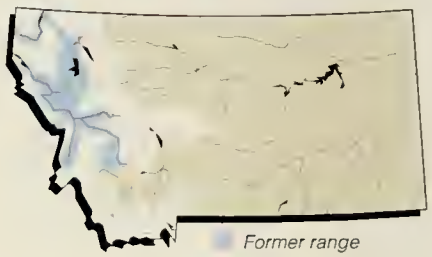
MICHAEL J. WOLF

DESCRIPTION: Adults are brown or green with large, dark spots surrounded by light-colored halos on the sides and back. The dorso-lateral folds (ridges along the sides of the back) are usually lighter in color than the surrounding background. The underside is typically white, but may be cream colored or yellowish. Adult body length is 2 to 5 inches. *Eggs and Tadpoles:* Eggs are laid in 2- to 5-inch globular masses composed of hundreds or thousands of eggs.

SIMILAR SPECIES: None. Newly transformed froglets, however, may lack spots, making them extremely difficult to distinguish from spotted and wood frogs.

HABITAT AND HABITS: Northern leopard frogs are found in or near water in nonforest habitats. They prefer densely vegetated areas such as wet sedge-meadows or cattail marshes Breeding takes place in lakes, ponds (temporary and permanent), springs, and occasionally backwaters or beaver ponds in streams. Eggs hatch in 4 to 15 days and tadpoles take 8 to 15 weeks to metamorphose.

STATUS: Historically widespread statewide but now apparently extinct over nearly all of western Montana. This species is still common in the southeastern corner of the state, but its status is uncertain in central and northeastern Montana. Widespread extinctions have been reported from most nearby states and provinces; in many parts of North America where it was common a few decades ago, it is now gone.



SPOTTED FROG (*Rana pretiosa*)

KRISTI DUBOIS

BILL SWANSON

DESCRIPTION: Adults are light to dark brown, gray, or olive green with dark spots (frequently with lighter centers) on the back, sides, and legs. The number of spots and spotting pattern varies. The back and sides are often covered with small bumps. The undersides of the legs are bright red, salmon, or orange; this bright color may extend up to the chin or be replaced by a light, mottled gray on the chin, chest, and/or belly. Adult body length is 2 to 4 inches. *Eggs and Tadpoles:* Eggs are laid at the water surface in large, globular masses of 150 to 500. Tadpoles are dark green with gold flecking above and iridescent bronze below. They may reach 3 inches in length; their eyes are located on the top of the head.

SIMILAR SPECIES: The bright pigment on the undersides of the legs distinguishes adults of this species from all other frogs in Montana. Younger individuals lacking bright legs are difficult to distinguish from wood and northern leopard frogs.

HABITAT AND HABITS: Spotted frogs are regularly found at water's edge in or near forest openings. Wetlands at or near treeline are also used, but populations are uncommon in large, open intermountain valleys. Breeding takes place in lakes, ponds (temporary and permanent), springs, and occasionally backwaters or beaver ponds in streams. All the egg masses in a particular pond are often found in the same location at the margin of the pond. Young and adult frogs often disperse into marsh and forest habitats, but are not usually found far from open water

STATUS: The most common frog in western Montana. Significant declines have been reported from states to the south and west.

WOOD FROG (*Rana sylvatica*)

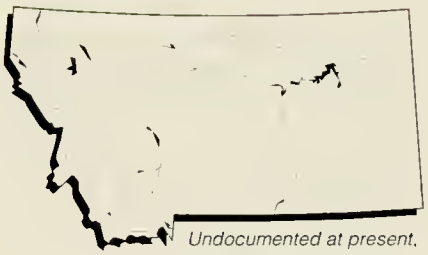
DESCRIPTION: Adults have a prominent black facial mask that extends from the tip of the snout to behind the external ear drum; the mask is bordered below by a white lip line. Upper background color varies, but most often it is brownish or gray. There may be dark spots on the back, and a light-colored line may run down the middle of the back. The belly is white to cream colored, sometimes with darker blotches on the chest and throat. Wood frogs have relatively smooth skin. Adult body length in is 1.3 to 3.3 inches. *Eggs and Tadpoles:* Females lay eggs in one to four masses, each containing 150 to 1,000 eggs. The eggs hatch in 18 to 20 days and tadpoles take 55 to 65 days to metamorphose. Tadpoles are dark gray or brown with a bronze sheen on the side.

GEOFFREY HAMMERSON

SIMILAR SPECIES: A juvenile spotted frog has more warts and bumps on the body, usually has a less distinct dark face mask, and its upturned eyes are mostly uncovered by the eyelids when viewed from above.

HABITAT AND HABITS: Wood frogs are regularly found near water in forest habitats. Breeding takes place in lakes, ponds (temporary and permanent), springs, and occasionally backwaters or beaver ponds in streams. They breed early in spring, often when ice is still being formed on ponds at night.

STATUS: Not known with certainty from Montana, but likely to be found eventually; it is present in Idaho, Wyoming, North Dakota, Alberta, and British Columbia Good-quality closeup photos or actual specimens are needed to verify its presence in Montana.



Undocumented at present, but likely to be found

REPTILES

ALLEN WIEDERICH

Turtles lack the teeth of other reptiles, but have a sharp cutting beak. Snapping turtles may bite when cornered.

Reptiles were the first vertebrates to become independent of the water. This ability required two adaptations: shelled eggs and dry, scaly skin. Shells allow eggs to be laid on land, eliminating the requirement for a period of life in the water. Dry, scaly skin protects reptiles from dehydration; many reptiles have even become successful desert dwellers. The scaly covering on reptiles is NOT slimy, as is commonly believed.

Reptiles first evolved 250 million years ago. They became the dominant life form during the Age of Dinosaurs, 210 to 65 million years ago. Three types of reptiles are found in Montana today: lizards, turtles, and snakes. About 100 species of lizards, 50 species of turtles, and 120 species of snakes are found in the U.S., but only 4 lizards, 3 turtles, and 10 snakes are native to Montana.

Montana's lizards have well-developed limbs and short bodies, are active during the day, and feed primarily on insects. Lizards are often observed with part of their tail missing; weak, breakable spots in the tail vertebrae help them escape predators.

Turtles, with their bony, protective shell, are familiar to most people. The three species in Montana are aquatic and lay their eggs in nests on banks of ponds, lakes, or rivers. They eat live or dead animals and vegetable material. Turtles lack the teeth of other reptiles, but have a sharp cutting beak that is quite efficient. Snapping and softshell turtles may bite if they are cornered or grabbed. They can easily mash or break a finger.

Snakes are perhaps the most feared group of animals, yet most species are harmless. Although about 8,000 people in the U.S. are bitten each year by poisonous snakes, only a few people die from these bites; in fact, more people are killed each year by bee stings or light-

ning. About half of all snakebites are suffered by people who are handling or trying to capture snakes.

Montana's snakes are exclusively carnivorous; they feed on a variety of animals, primarily rodents, amphibians, and invertebrates. Montana's only poisonous snake, the western rattlesnake, is actually quite shy. Given the chance, it will usually move away and hide. However, in snake country it is a good idea to wear high boots and long, loose pants, and to take care in turning over anything a snake could be hiding under.

If you are bitten by a rattlesnake, get to a doctor quickly, but avoid strenuous exercise that will increase your heart rate. You may clean the bite with soap and water. If a doctor is not immediately available, apply a suction device to the bite and leave it there for 30 minutes. Do not use alcohol or drugs for snakebite; ice, tourniquets, and incisions are no longer recommended for field treatment because of the potential for tissue damage.

SHORT-HORNED LIZARD (*Phrynosoma douglasi*)

DENNIS FLATH

DESCRIPTION: This lizard has a broad, somewhat flattened body and relatively short limbs and tail. It is generally tan to gray with dark and light spots and blotches. A distinctive line of pointed scales runs along each side. Adult body length is 1.7 to 5.5 inches.

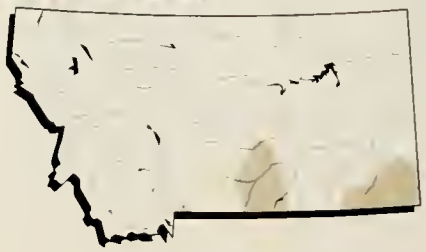
SIMILAR SPECIES: None.

HABITAT AND HABITS: Short-horned lizards are found in a variety of habitats, including dry, open forests, grasslands, and sagebrush areas with loose or sandy soil. They are active during the day, especially mid- to late morning. Little is known about their reproduction in Montana; young are born alive, presumably in late summer. Ants are the primary food.

STATUS: Widely distributed (but somewhat localized) in eastern Montana.

SAGEBRUSH LIZARD (*Sceloporus graciosus*)

KRISTI DUBOIS



DESCRIPTION: This small, narrow-bodied lizard is typically brown, gray, or cream. Adults have alternating dark and light stripes running down the back. Males have mottled blue throat patches and bright blue belly patches. The body and tail scales appear somewhat spiny. Adult body length is 1.5 to 2.5 inches.

SIMILAR SPECIES: The western skink has smooth, shiny scales on the body and tail.

HABITAT AND HABITS: Sagebrush lizards are found primarily in sagebrush areas, but also in open forests and brushlands. In the Yellowstone National Park area, they are found near thermal features. They are active during the day, feeding primarily on insects. Females lay 2 to 7 eggs in loose or sandy soil in early summer; the young hatch in late summer.

STATUS: Locally common along the southern border of Montana from Yellowstone National Park eastward.

NORTHERN ALLIGATOR LIZARD (*Elgaria coerulea*)

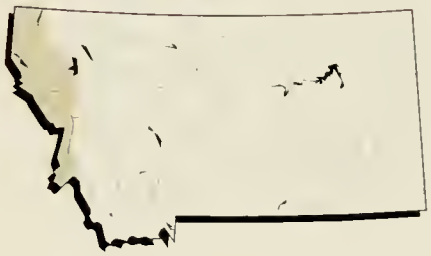
DESCRIPTION: This elongate lizard has relatively short limbs and a lateral skin fold on each side of the body. The back is marked with broken, indistinct black and brown crossbands, and the belly has a series of longitudinal dark lines located at the scale junctions. Young lizards have a more distinct banding pattern on the back. Adult body length is 3.5 to 5.5 inches.

SIMILAR SPECIES: Both the western skink and sagebrush lizard have stripes running down the back.

HABITAT AND HABITS: Alligator lizards are found in a variety of habitats—under logs in dry, open forests; near streams in moist, cool forests; and around buildings. Little is known about their reproduction in Montana; mating is assumed to take place in spring, with young born in late summer. They are primarily carnivorous, feeding on a variety of small insects and other invertebrates.

STATUS: Localized distribution in northwestern Montana.

RICK & NORA BOWERS



WESTERN SKINK (*Eumeces skiltonianus*)

DESCRIPTION: This lizard has smooth, round, shiny scales and an elongate head Adults have a broad, brown stripe edged with black running lengthwise down the back. The brown stripe is paralleled by a light and then a dark stripe on each side of the body. The stripes extend onto the head but fade on the tail. In young lizards, the tail is bright blue but the color fades with age. Adult body length is 2 to 3.5 inches.

SIMILAR SPECIES: The sagebrush lizard has somewhat spiny scales on the body and tail.

HABITAT AND HABITS: Western skinks are usually found in dry forests, or drier sites in so-called "moist" forests such as Douglas-fir. They may be seen sunning themselves in open areas. Although active during the day, skinks are secretive and not often seen. They are thought to lay two to six eggs, but little information is available for Montana. In other places, females guard the eggs until hatching.

STATUS: Known from only a few locations in northwestern Montana.

RICK & NORA BOWERS

PAINTED TURTLE (*Chrysemys picta*)

DESCRIPTION: The upper shell is olive to black, with the edges of shields (plates making up the shell) bordered with yellow. The head, neck, and legs are marked with yellow lines, and a red spot appears behind the eye. The lower shell is brightly colored with red and yellow. Females may reach 9 inches in upper shell length, but males seldom reach 7 inches. Males have much longer front claws than females, and the vent is situated farther from the edge of the shell.

SIMILAR SPECIES: None. Very dark individuals have been found with vermiculated lines on the shell and a much-reduced color pattern on the head, neck, and limbs.

HABITAT AND HABITS: Painted turtles are found in lakes, ponds, reservoirs, and sloughs that contain some shallow water areas and a soft bottom; also river backwaters and oxbows with little current. They often use logs and rocks for basking. Painted turtles hibernate in bottom mud from early October to mid- or late April. They reproduce at 4 to 8 years of age, depending on climate (later in northern latitudes). Six to 20 leathery eggs are laid in nests excavated in gravel or sand. Food items include aquatic vegetation, frogs, tadpoles, small fish, and a variety of invertebrates.

RODNEY SCHLECHT

STATUS: Common and widespread across most of Montana.

SPINY SOFTSHELL (*Trionyx spiniferus*)

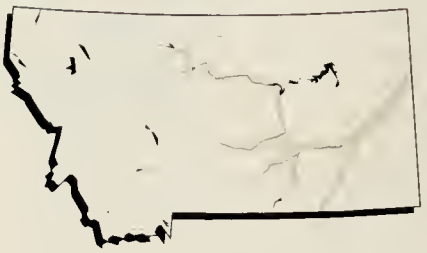
DESCRIPTION: This highly aquatic turtle has a flexible, leathery shell. Adults have an olive-gray upper shell marked with dark spots, and a white or cream-colored lower shell. Upper shell length in females is 18 inches or more; in males, it is 6 to 8 inches. A pointed snout with terminal nostrils allows this turtle to remain beneath the surface and take in air through its "snorkel."

SIMILAR SPECIES: None.

HABITAT AND HABITS: Spiny softshells are found in rivers and connecting backwaters with silty or sandy bottoms. Unlike other Montana turtles, they do not move overland from one water body to another. They use mud and sand banks and bars for both basking and nesting. When frightened, they escape by literally diving into the bottom mud Nests are flask-shaped excavations in which 20 to 30 hard-shelled eggs are laid. Food items include fish, crayfish, frogs, toads, and carrion. Soft-shelled turtles have a long, agile neck and can inflict a painful bite. They can be safely handled by grasping the shell on each side between the front and rear legs with the head pointing *away* from the captor.

ALAN G. NELSON

STATUS: Mainly found in the Yellowstone and Missouri rivers and their major tributaries. Distribution in other drainages is uncertain.



SNAPPING TURTLE (*Chelydra serpentina*)

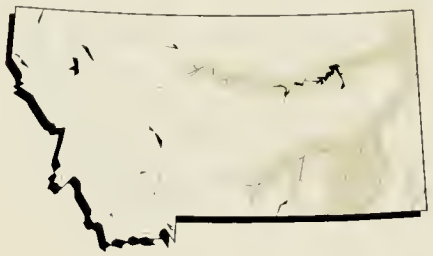
DESCRIPTION: The snapping turtle appears too large for its shell. The upper shell is olive gray, and the much–reduced lower shell is cream colored. Adults have a long, keeled tail and warty tubercles on the head and neck. Males average 10% to 20% larger than females. Most adults range from 13 to 30 pounds in Montana. The largest known Montana specimen was a 47–pound male.

SIMILAR SPECIES: None.

HABITAT AND HABITS: Snapping turtles are found in stock ponds, reservoirs, sloughs, backwaters, rivers, and irrigation ditches. They eat mostly animal matter, preying on anything they can catch, including small birds. They lay their clutches of 8 to 80 leathery eggs in nests excavated in sandy or gravelly areas or muskrat houses. In winter they hibernate beneath the water's surface in soft mud, under cutbanks, or among submerged roots. Snapping turtles have a reputation for inflicting nasty bites with their powerful jaws. They can be handled safely if carried by the tail with the upper shell *away* from the captor.

STATUS: Found in the Yellowstone River below Billings, the Missouri River below Fort Benton, and all tributaries with suitable water. They may inhabit any water body in proximity to the stretches of river listed above that can be reached by a short trek across land. Irrigation ditches have aided their distribution. Snapping turtles observed in western Montana are probably transplants.

ALLEN WIEDERRICH



RUBBER BOA (*Charina bottae*)

DESCRIPTION: This snake looks and feels like rubber, hence its name. It is a small, stout snake (12 to 28 inches) with very small eyes and a blunt tail. The scales are small and smooth, except for those on the head, which are enlarged. The back is colored a uniform brown or green, and the belly is cream to tan. Young snakes are more tan (even pinkish) than the adults on both surfaces.

SIMILAR SPECIES: The racer is much more active, has larger eyes, and has a thin, tapered tail.

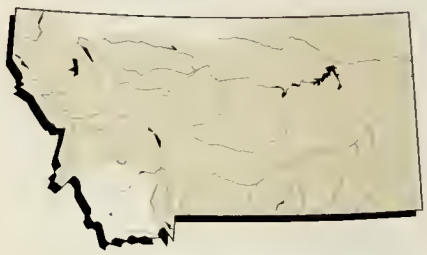
HABITAT AND HABITS: Rubber boas are secretive, slow–moving, docile snakes, usually found under logs and rocks in either moist or dry forest habitats. They are primarily nocturnal, but occasionally may be observed sunning on roads, trails, or in open areas. They feed primarily on small mice but also take shrews, salamanders, snakes, and lizards. Two to eight young are born alive in late summer or early fall.

STATUS: Not often seen, but widely distributed and probably common throughout western Montana.

BILL SWANSON

RACER (*Coluber constrictor*)

PHIL FARNES



DESCRIPTION: A slender, moderately long snake, the racer ranges from 20 to 65 inches in length. In adults, color of the back can vary from uniform greenish gray to brown or blue. The belly is whitish to pale yellow, the latter extending onto scales of the upper lips and nasal region of the head. The eyes are relatively large, and the scales are smooth. Young snakes (up to about 20 inches) have a much different coloration than adults. On the back, a series of brown blotches edged with black runs the length of the snake; a row of blotches on each side also extends onto the belly

SIMILAR SPECIES: See gopher snake and rubber boa.

HABITAT AND HABITS: Racers are associated with relatively open habitats either in shortgrass prairie or forested areas. Very fast and active, they prey on insects and small vertebrates such as mice and frogs. Females lay a clutch of three to seven eggs in summer.

STATUS: Fairly common in eastern Montana, but somewhat localized in western Montana valleys.

WESTERN HOGNOSE SNAKE (*Heterodon nasicus*)

RODNEY SCHLECHT

DESCRIPTION: This mid–sized, heavy–bodied snake can reach 32 inches. The background color of the back is yellowish to grayish brown, with three rows of dark brown to black blotches running longitudinally. The belly is dark gray to black, and sometimes checkered The nose is upturned.

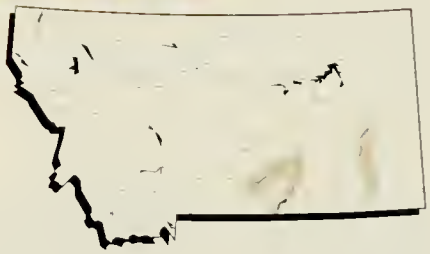
SIMILAR SPECIES: The color pattern is similar to that of both the gopher snake and western rattlesnake, but no other Montana snake has an upturned nose.

HABITAT AND HABITS: Western hognose snakes are found on the plains of eastern Montana. They prefer arid areas, farmlands, and floodplains, particularly those with gravelly or sandy soil. The shovel–like nose is thought to help the snake dig down to its prey, which it locates by smell. Apparently toads are the preferred food, although frogs, insects, and small mammals are also eaten. It is active primarily during the day. Females typically lay clutches of 7 to 15 leathery, white eggs, and probably breed only every other year in Montana. This snake is famous for its behavior when threatened At first it puffs up its neck, cobra-like, and hisses and strikes at its enemy. If this strategy does not work, it writhes on the ground convulsively and eventually rolls on its back and pretends to be dead. If left alone for a few minutes, it rights itself and continues on its way.

STATUS: Reported infrequently in Montana. Desired for the pet trade, it may be vulnerable to commercial collecting.

MILK SNAKE (*Lampropeltis triangulum*)

GEOFFREY HAMMERSON



DESCRIPTION: This medium-sized, slender snake can reach a length of 42 inches. It has a highly recognizable series of red to orange saddles or rings that are bordered by black rings and separated by white to yellow rings.

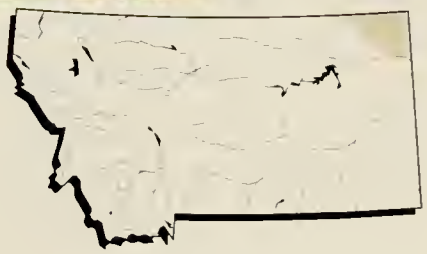
SIMILAR SPECIES: None.

HABITAT AND HABITS: Little is known of milk snakes in Montana because only a few have been reported. In Wyoming they are usually found near rock cliffs, which may also be the case here. Primarily nocturnal, they eat a variety of small vertebrates, including other snakes. They sometimes vibrate their tails when disturbed. Their name stems from an old wives' tale alleging that these snakes milk cows.

STATUS: Very rare and local in Montana. The Montana subspecies, the pale milk snake, is highly sought for the pet trade.

SMOOTH GREEN SNAKE (*Opheodrys vernalis*)

GEOFFREY HAMMERSON



DESCRIPTION: This small, slender snake reaches only about 26 inches in length. It is bright grass green in color above and whitish below. Each nostril is centered in a single scale.

SIMILAR SPECIES: Racers are olive green, typically with a yellowish belly; they also have nostrils bordered by two scales.

HABITAT AND HABITS: Smooth green snakes are typically found in wet meadows in dense vegetation. However, some isolated populations in Wyoming are found in open, grassy meadows of forested foothills; searching for this snake in similar areas of eastern Montana could document its presence well outside the known range. It should be looked for under logs, boards, or rocks in meadow areas. Females lay about four eggs that hatch within a few days.

STATUS: Rare and only known from the far northeastern corner of Montana.

GOPHER SNAKE (*Pituophis catenifer*)

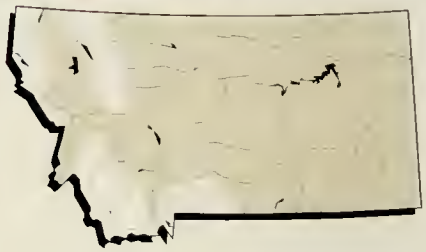
LEE GRAVES

DESCRIPTION: The gopher or bull snake can reach a length of 7 feet (it is Montana's largest snake), but most range from 3 to 5 feet. It can be readily identified by a series of large black to brown blotches that run down the back, and another series along the sides. The blotches, which are set on a yellow background, become more widely spaced toward the tail. The dorsal scales are keeled (have a ridge running down the center). A black band can usually be seen on the head in front of and extending below the eyes. The belly is yellow to white, often spotted with black.

SIMILAR SPECIES: Young gopher snakes can be confused with young racers, which also have alternating black blotches. However, in racers the dark blotches are bordered with black and the scales are not keeled. See western hognose snake and western rattlesnake.

HABITAT AND HABITS: Gopher snakes are associated with dry habitats, including open pine forests. They feed on rodents, rabbits, ground-dwelling birds, and to a lesser extent lizards. They sometimes hiss and vibrate their tail when alarmed, producing a sound similar to that of rattlesnakes. They occasionally climb trees. Females lay 2 to 24 eggs in summer.

STATUS: Somewhat common across most of the state.



WESTERN RATTLESNAKE (*Crotalus viridis*)

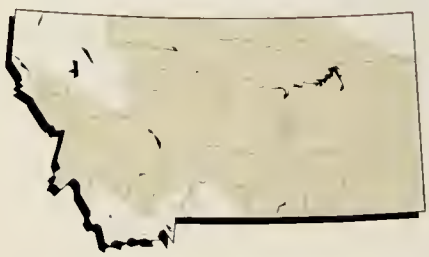
KEN MILLS

DESCRIPTION: Adults have a triangular head, blunt nose, narrow neck, and stout body; they range in length from 15 to 60 inches. The background color above varies from pale green to brown; a series of brown or black blotches edged with a dark and then a light line extends the length of the body. The blotches often merge into rings on the tail. There are also blotches on the sides. The belly is pale yellow to white and lacks blotches. All rattlesnakes have a heat-sensing pit located between the nostril and the eye. The fangs are hollow and hinged, allowing them to be folded back against the roof of the mouth. The tail ends in a rattle that helps warn potential predators of the snake's presence.

SIMILAR SPECIES: No other snake in Montana has rattles (see gopher snake and western hognose snake).

HABITAT AND HABITS: Western rattlesnakes favor open and arid country but are also found in ponderosa pine stands and mixed grass-coniferous forests. They are more likely to be encountered on south-facing slopes and in areas with rock outcrops. Rattlesnakes den communally, but range up to 7 miles from the dens during summer. Females give birth to 4 to 21 young in late summer; the young are marked similarly to adults, but colors are brighter. Rattlesnakes prey on a variety of animals, including mice, ground squirrels, and rabbits.

STATUS: Locally common in most of Montana. Feared and often needlessly killed due to its poisonous bite. The habit of denning at traditional sites in large numbers makes it vulnerable to commercial collecting or killing



COMMON GARTER SNAKE

(*Thamnophis sirtalis*)

DESCRIPTION: Adults range from 16 to 42 inches in length. This snake has two color variations in Montana: The first has three yellow longitudinal stripes (one dorsal and two lateral) and a black stripe broken by red spots between the yellow stripes. The lateral stripes are located on the second and third scale rows above the belly scales. The second color variation has the same striping pattern but lacks the red dots. In both variations, background color between stripes is black to dark olive. The belly color ranges from yellow to bluish, and some individuals of the red-sided color variation have small black spots on the edge of the belly scales. The dorsal scales are keeled, and normally there are seven scales on the upper lip.

SIMILAR SPECIES: The western terrestrial garter snake has black spots overlapping the dorsal yellow stripe, and the background color between stripes tends to be brownish. The plains garter snake has its lateral yellow stripes on the third and fourth scale rows above the belly scales, and the dorsal stripe is often orange or red.

HABITAT AND HABITS: Garter snakes are found in nearly all habitats, but most commonly at lower elevations around water. Females give birth to 6 to 18 live young during summer. They eat a variety of vertebrates and invertebrates.

STATUS: Both color variations are found in northwestern Montana; the red-sided variation is also common across most of the remainder of the state.

KIRWIN WERNER

CHARLES R. PETERSON

WESTERN TERRESTRIAL GARTER SNAKE (*Thamnophis elegans*)

DESCRIPTION: Adults vary from 16 to 43 inches in length. This snake is distinguished by three yellow stripes (one dorsal, two lateral) running the length of the body and a series of black spots situated between, and somewhat on, the stripes. The background color between the stripes is brownish or greenish. All-black individuals are occasionally found. A series of dark black/brown blotches covers most of the belly. There are normally eight scales on the upper lip.

SIMILAR SPECIES: See common and plains garter snakes.

HABITAT AND HABITS: Similar to the common garter snake.

STATUS: The most common snake in much of Montana.

MILO BURCHAM

PLAINS GARTER SNAKE

(*Thamnophis radix*)

DESCRIPTION: Adults range from 16 to 42 inches in length. Background color above is olive, brown, or black. This snake has an orange or yellow dorsal stripe and two greenish-yellow stripes on each side (the latter located on the third and fourth scale rows above the belly scales). It typically has black vertical bars on the upper lips.

SIMILAR SPECIES: Other garter snakes in Montana have the lateral yellow lines on the second and third scale rows above the belly scales.

HABITAT AND HABITS: Similar to the common garter snake.

STATUS: Found over much of eastern Montana. Status unclear because of confusion in identification.

MILO BURCHAM

OBSERVING REPTILES AND AMPHIBIANS

The easiest way to observe reptiles and amphibians is to bring a child along, since children seem able to find frogs (and get muddy) where adults have problems even finding the water! However, looking for amphibians and reptiles involves more preparation than going birding. Success requires being in the right place at the right time. Different species are present in different habitats and are active at different times of the day and year, depending on temperature and weather. You may end up turning over logs or rocks and slogging through water and mud in the dark.

The following tips may help you in your search. Many amphibians and reptiles are most active during the breeding season (usually spring), when they tend to concentrate at ponds or dens. Ponds are great for many species, and the calling of frogs and toads may lead you to the best ones. Searching these areas at night with a flashlight or headlamp will yield amphibians seldom seen during the day. Especially fruitful may be searches on warm, rainy nights when amphibians are most active. Both reptiles and amphibians may be found hiding under logs, rocks, or other debris (please return these objects to their original positions if you move them). And be careful of the possibility of rattlesnakes under the object. "Road hunting" for reptiles can be productive, especially on warm, rainy summer nights. Drive slowly along little-used roads and watch for amphibians and reptiles in the headlights, but be careful of other cars.

CONSERVATION

Many amphibians are apparently declining in the United States and in other parts of the world. Habitat alteration and fragmentation, acid rain, increased ultraviolet light due to ozone depletion, pollution by toxic chemicals and heavy metals, predation and/or competition by introduced species, drought, and climate change have all been suggested as possible causes. Declines are particularly severe in the western United States among frogs and toads, even in such pristine environments as national parks. Northern leopard frogs and western toads have become extinct over much of Colorado, and spotted frogs have declined dramatically in the southern mountains of Nevada and Utah and west of the Cascade Mountains in Washington and Oregon. In Montana, northern leopard frogs were abundant throughout the western intermountain valleys at least through the mid-1970s; today we know of only a single location where they remain in the western part of the state.

RICK & NORA BOWERS

It seems clear that no single factor is responsible for recent worldwide declines, but several factors in combination may cause extinctions. For example, where drought may have caused local extinctions in the past, recolonization could often eventually occur. Today, however, because of habitat loss and fragmentation, such recolonization is less likely.

Little is known about the population trends of Montana's reptiles. While they have not suffered the dramatic declines of some amphibians, there may still be reason for concern. Some species are uncommon or rare with limited distribution or narrow habitat requirements. Because of this, they are vulnerable to collecting and export. We increasingly hear reports of Montana's amphibians and reptiles showing up in out-of-state pet shops. Snakes are especially popular in the pet trade, and populations in other areas have been damaged by commercial collecting

DAVID CONKLIN

Gateway to the Breaks

HELL CREEK STATE PARK

by Mike Hathaway

"Well, what's it like?" the voice inquired over the phone. "Is the fishing good? What can you catch? Are there hordes of other fisherman? Can you pull your boat up on shore where you want to? And what's the deal with that name, Hell Creek? With a name like that, what are you folks trying to *hide* up there?"

The only thing hidden around here, I thought, is the top of my desk. I'm up to my neck in paperwork, and someone wants to know what we're hiding at Hell Creek! I thought for a moment about sending the call over to the fisheries division, but after a swallow of hot tea, I decided to give it a try. After all, the parks division has been involved with Hell Creek State Park since 1949, so we ought to have something to offer.

First off, Hell Creek isn't the most fitting name for this area. While some of the badlands topography can perhaps be thought of as "hellish"—especially on a hot summer day—the name "Gateway Creek" would describe the area better, since Hell Creek serves as a gateway to the Missouri River breaks and Fort Peck Reservoir, a remote and scenic portion of eastern Montana.

Formed by construction of Fort Peck Dam on the Missouri River in the 1930s, Fort Peck Reservoir—Montana's largest body of water—boasts 1,500 miles of shoreline and a depth in places of more than 200 feet. Thriving populations of walleye, sauger, smallmouth bass, northern pike, lake trout, and chinook salmon cruise its myriad bays, coves, and inlets, attracting anglers from all over the country. The reservoir is surrounded by the 304,301-acre C.M. Russell National Wildlife Refuge, a vast, rugged mixture of prairie and badlands inhabited by

MT FISH, WILDLIFE & PARKS

Anglers come from far and wide to explore Fort Peck Reservoir's 1,500 miles of shoreline and myriad bays and inlets. In recent years, state record walleye, sauger, and smallmouth bass have been taken from its waters.

MT FISH, WILDLIFE & PARKS

deer, antelope, elk, and even bighorn sheep.

Hell Creek, located on the south shore of the reservoir 26 miles north of Jordan (see map), has been a popular camping and fishing destination since the reservoir began to fill more than half a century ago. The area's relatively easy access by land and the calm, protected waters of the reservoir's Hell Creek Arm made it a natural choice for a developed recreation site.

In 1949 the Montana State Park Commission (the forerunner of FWP's Parks Division) accepted responsibility for park development and maintenance at Hell Creek. Hampered by limited funds, the commission relied on the U.S. Army Corps of Engineers, which manages the dam and reservoir, to finance the park's initial establishment. At about this time, the Corps of Engineers also leased several cabin sites nearby, and the Boy Scouts of America established a camp area along the park's southern edge.

Few improvements were made at Hell Creek from that time until the late 1960s and early 1970s, when some money became available for campground development. In 1970, the park received a substantial boost when Jordan-area residents Karl Hinther and his wife were granted permission to develop a marina and store concession. Since the early 1970s, nearly half a million dollars has been invested in the site by various agencies, primarily for improvements to the county road leading from Jordan to Hell Creek and a recently completed water system.

Today, the 337-acre park has three campgrounds along the shoreline that offer a variety of sites. Campers can choose between open areas near the water's edge or more sheltered sites farther inland. All designated sites have picnic grills and tables, and a few sites in the main campground have shade/windbreak structures. A new water system provides drinking water at the main campground only, and a building with flush toilets is available for use. With these creature comforts, Hell Creek State Park makes a good base camp for exploring the reservoir by boat, fishing its waters, or recreating on nearby public lands.

Although the state has been responsible for managing Hell Creek from its inception as a park, the U.S. Army Corps of Engineers has always owned the land. As FWP's Parks Division began a streamlining process in the 1980s and 1990s due to increasing financial problems, the state negotiated with the federal government to consolidate efforts in places where both were operating recreation areas in the same vicinity. This led to an agreement in 1994 between FWP, the U.S. Army Corps of Engineers (COE), the Bureau of Land Management (BLM), and the U.S. Fish and Wildlife Service (FWS) for joint management of Hell Creek State Park. This cooperative agreement offers several advantages and allows improvements that otherwise would not have been possible (for example, the new water system, which was jointly

funded by the U.S. Army Corps of Engineeers and FWP).

Under the new partnership, the Bureau of Land Management now takes the lead in managing day-to-day operations at the site, including staffing, maintenance, and fee collection. FWP administers a fund created by park user fees to offset operational expenditures, and continues to work with the concessionaire who operates the Hell Creek marina and store. The Corps of Engineers maintains the three boat ramps at the site. And the U.S. Fish and Wildlife Service serves in a consulting capacity due to its responsibility for management of the vast C.M. Russell National Wildlife Refuge (CMR) surrounding the park. With the collective strengths and abilities of these partners, the outlook for Hell Creek's future is brighter than ever.

DONITA SEXTON

Four of the eight Tyrannosaurus rex *skeletons found in the world have come from eastern Montana's Hell Creek formation. In 1990, the most complete Tyrannosaurus skeleton discovered to date was carefully unearthed and moved to the Museum of the Rockies in Bozeman.*

History

Prior to the ice age, the Missouri River flowed northeast from present-day Great Falls toward Havre, and then eastward along what is now the Milk River Valley. Then, glaciers advancing from the north forced the Missouri to seek a new channel south of its original course. Once the river settled into its new route, it quickly carved through soft shales and sandstones deposited roughly 100 million years ago when the region was covered by a shallow inland sea. Side drainages formed as well, devouring the adjacent benchlands and creating a badlands topography.

These sedimentary materials provide an important link to the past through the many fossils they contain, from ancient sea-dwelling creatures to exotic land-dwellers like dinosaurs. Since the early 1900s, some outstanding fossil discoveries have been made in the region surrounding Fort Peck Reservoir. Four of the eight *Tyrannosaurus rex* skeletons found in the world have come from exposed remnants of the Hell Creek Formation; the earliest was unearthed in 1902 and the most recent in 1990.

In more recent geologic times, the area was home to nomadic groups and then to Native American tribes like the Sioux, who hunted bison and other game in this area for centuries. Not long after Lewis and Clark traveled through the area in the spring of 1805, traders began to ply the upper Missouri River. Fort Peck was named for the original trading post of Durfee and Peck, which stood on the west bank of the Missouri River about a mile upstream from the present site of Fort Peck Dam. During the era of steamboat transportation on the upper Missouri, the post became a convenient landing for stern-wheelers journeying upstream.

Recreation

Anglers visiting Fort Peck Reservoir will find excellent fishing for a variety of species. In recent years, state record walleye, sauger, and smallmouth bass have all been taken from its productive waters. Fishermen should come prepared for big water, as distances between marinas can be 50 or more miles, and squalls and winds can whip up large waves in a hurry. A depth finder/fish locator is a great aid in finding gamefish and the schools of baitfish that gamefish follow. By using a flasher unit in conjunction with the finder, boaters can safely navigate shallow points, sunken islands, and other remnants of the weathered hills, rocky ridges, and deep coulees that surrounded the Missouri River in this area before the reservoir filled. Because of the remoteness of the reservoir and surrounding lands, boaters should pack warm clothing, rain gear, extra food, and some type of shelter in case of a breakdown or emergency.

Hunters, too, are drawn to the rugged lands surrounding Fort Peck Reservoir for the outstanding big game and upland bird hunting opportunities the area provides. The C.M. Russell National Wildlife Refuge (CMR) is a premier area for deer and antelope, especially trophy mule deer, and supports a healthy elk herd that is hunted on a permit-only basis. Last year, approximately 725 elk permits were issued on the CMR and adjacent lands. Upland game birds are scattered throughout the refuge, with sharptail and sage grouse the most common species. Like fishermen, hunters should be prepared for sudden changes in weather, especially rain, which can make many of the backcountry roads impassable. The CMR is subject to both state and federal regulations, so visitors should obtain information from refuge headquarters before their trip (see sidebar).

Hiking and sightseeing are largely untapped resources in the Missouri

River breaks country. Although fewer formal trails exist in this part of the state than farther west, traveling the 700-plus miles of refuge roads or hiking cross-country in the CMR or along the shores of Fort Peck Reservoir can provide outstanding opportunities for photography, nature study, and wildlife viewing. A number of trails exist within driving or hiking distance of Hell Creek State Park. Hiking options range from exploring the 20,000-acre UL Bend Wilderness in the western half of the refuge to traversing the badlands country in parts of the eastern half of the refuge. The remote nature of this area should be taken into consideration when planning a trip. Vehicle access can be difficult, especially during wet weather—obtaining local information is advisible.

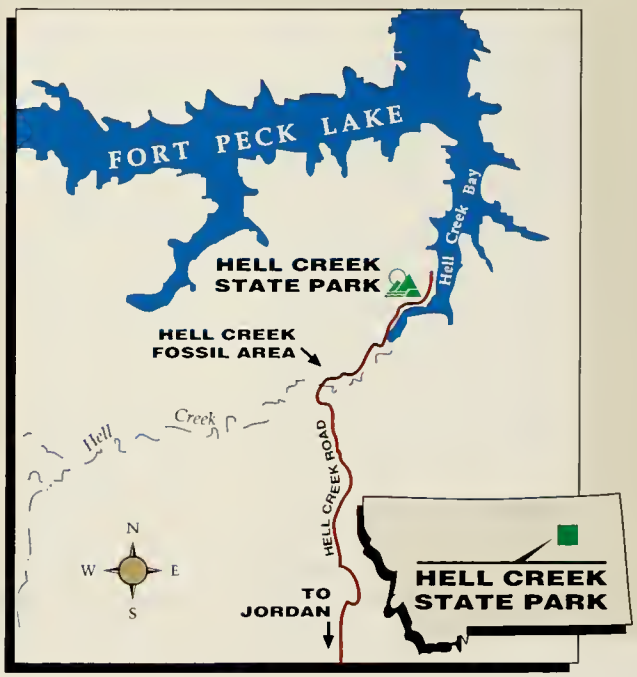
While the rugged country surrounding Fort Peck Reservoir and the distances that must be traveled to reach some areas can be daunting, the area's scenic vistas, fragile beauty, and diverse resources make a trip there highly rewarding. Whether your tastes run toward fishing, hunting, hiking, sightseeing, or wildlife viewing, Hell Creek State Park is the southern gateway to a Missouri breaks adventure. ■

Hell Creek State Park

Location: South shore of Fort Peck Reservoir, Hell Creek Arm, 26 miles north of Jordan.
Size: 337 acres, leased by FWP from the U.S. Army Corps of Engineers.
Access: From Jordan, take gravel Hell Creek Road north for 26 miles; travel during wet weather is not recommended.
Management goal: To protect the natural ecosystem of the area while providing opportunities for public enjoyment of this unique state park.
Recreational opportunities: Camping, fishing, pleasure boating, waterskiing, hiking, wildlife viewing, photography.
Season: The park is open year-round, with heaviest summer use between Memorial Day and Labor Day. It also receives heavy use during hunting season. The water system and flush toilets are operational from mid-May through mid-September.
Miscellaneous information: A day-use fee of $3.00 per vehicle or a Montana State Parks Passport is required. The camping fee is an additional $4.00 per site, per night. The park contains three campground areas with more than 40 campsites. Drinking water and flush toilets are available in the main campground. A full-service marina with groceries, fishing supplies, boat fuel, and other amenities is open from approximately mid-May through October.
Fishing and hunting information: Fishing information is available from marinas at Hell Creek, Fort Peck, Rock Creek, and Crooked Creek, and from sport shops in Jordan, Fort Peck, Glasgow, and Lewistown. Several amateur and professional tournaments are held each year, including two based at Hell Creek (the Montana Bass Federation smallmouth bass and Hell Creek walleye tournaments). Hunting information can be obtained at FWP regional offices in Glasgow and Miles City, and at the C.M. Russell National Wildlife Refuge office in Lewistown. Area maps can be obtained from: Bureau of Land Management; P.O. Box 36800; Billings, MT 59107 (surface management edition map for the Hell Creek Vicinity is called Fort Peck Lake East); and C.M. Russell National Wildlife Refuge; P.O. Box 110; Lewistown, MT 59457-0110.

DAVE BOOKS

Sage grouse



WILDLIFE PROGRAMS:

WE'RE ALL IN THIS TOGETHER

by NELS RODEFELD and BETSY SPETTIGUE

BIRD HUNTERS AND BIRDWATCHERS—TWO GROUPS THAT USE WILDLIFE. GROUSE HUNTERS HARVEST BIRDS FOR FOOD AND RECREATION WHILE BIRDWATCHERS PURSUE EAGLES AND OSPREYS TO WATCH AND LEARN.

Both groups engage in their activities because it gives them great pleasure and satisfaction to be outdoors—to renew their connection with wildlife and nature. The one desire foremost to both groups is the conservation of the species they enjoy and the habitats that support those species, to ensure that healthy wildlife populations will always exist.

With so much in common, why haven't hunters, birdwatchers, and other outdoor enthusiasts joined together to promote their common goals?

Some people would say that the act of harvesting wildlife is too great of a difference to span. They say hunters are "consumptive" users but others who enjoy wildlife (like campers, photographers, hikers, etc.) are "nonconsumptive" users. In reality, there is no such thing as a nonconsumptive user of wildlife. We'd even be so bold to say that every human on this planet "consumes" wildlife—we sacrifice wildlife habitat every day to build our homes, feed ourselves, and run our offices and businesses.

However, it's not too late for people to protect the vast majority of wildlife species. The International Association of Fish and Wildlife Agencies (IAFWA), a group representing public fish and wildlife agencies from all 50 states, Mexico, and Canada, is proposing a way for all outdoor enthusiasts to help protect and conserve all wildlife species and their habitats: the Wildlife Diversity Funding Initiative.

DONALD M. JONES

The IAFWA is working with many different wildlife-oriented groups to secure a funding mechanism similar to the existing and highly successful federal aid programs for sport fish and wildlife species. That mechanism is a dedicated user fee on outdoor recreation equipment such as camping gear, photography equipment, binoculars, scopes, and backyard wildlife supplies such as bird feeders and bird seed. This modest dedicated user fee, not to exceed 5%, would be collected from manufacturers on the wholesale value of their products. This would amount to 30 cents on a $6 pack of film, or $5 on a $100 backpack. The money would be distributed to state wildlife departments using a formula based on population and land area of each state. The funds would be dedicated by law to be used only for wildlife diversity projects focused on conservation, recreation, and education.

Although we all consume wildlife, either directly or indirectly, we don't all pay to preserve and manage it. It's been hunters and anglers who have

financed the vast majority of conservation and management efforts. That's not to say that birdwatchers, campers, and other outdoor recreationists haven't provided financial support. However, no institutional mechanism exists to generate funds specifically earmarked for the conservation and management of those species that aren't hunted, fished, or have become endangered.

Some states use general tax revenues to fund their nongame activities, but some don't. States that rely on tax dollars are often subject to political mood swings and reliable funding simply can't be guaranteed. Montana Fish, Wildlife & Parks (FWP) does not receive any general fund money for its fish and wildlife programs. FWP's nongame program is supported primarily by license fees.

Almost 60 years ago, hunters asked Congress to create a permanent method of raising money that individual states could use to manage their wildlife populations. They even stepped forward, pocketbooks in hand, to say they would support a 10% tax on hunting equipment in order to better manage America's game animals. The result was the 1937 Federal Aid in Wildlife Restoration Act, often called Pittman-Robertson (PR). In 1950, anglers did the same and the Federal Aid in Sport Fish Restoration Act, commonly referred to as Dingell-Johnson (later expanded as Wallop-Breaux), was enacted to help improve fish populations and aquatic habitat.

These two user fee programs have enjoyed many successes. Deer, elk, antelope, wild turkey, and waterfowl are shining examples of how these programs work to preserve habitat and increase populations through better research and management. Supporters of the Wildlife Diversity Funding Initiative are modeling their proposed user-pay/user-benefit funding plan after these successful programs.

The dedicated user fee on outdoor products would raise an estimated $350 million a year. That would mean Montana would receive about $8 million to spend on such fish and wildlife conservation efforts as preventing species and their habitats from becoming endangered, providing opportunities for all Montanans and visitors to experience wildlife and nature, increasing wildlife viewing opportunities, and educating Montanans about important wildlife issues. It's easy to see that this would allow FWP to do much more for Montana's "common" wildlife species.

And what about FWP's traditional constituents? How would bringing nonhunters and nonanglers into the paying family benefit them? Some of the new funds would be used to set aside critical habitats for species in decline. Just as habitats perserved for game animals also benefit other species, so too would habitat set aside for nongame species benefit deer, elk, moose, mountain goats, and other hunted species. It also would allow traditional wildlife users to inform additional audiences about their contributions to wildlife conservation and management. Public wildlife agencies have long been accused of "preaching to the choir" about the role hunters and anglers have played in restoring and enhancing our nation's wildlife.

As with any family, there undoubtedly would be growing pains. Some traditional wildlife users may worry that this wildlife diversity program would give some segments of the population an influential voice within wildlife agencies—a voice that could curtail such activities as hunting and trapping. But that's not the intent. Rather, the idea is to provide more opportunities for all wildlife enthusiasts by creating a broad-based, diverse coalition of groups working together to aid wildlife populations and protect habitat. Such coalitions are long-term commitments, the kind that require sacrifices yet the kind that can provide great rewards. Bird hunters and birdwatchers—a marriage of two groups, both dedicated to the common goal of perpetuating wildlife for a healthy environment and our grandchildren's enjoyment. ■

JEFF & ALEXA HENRY

The Wildlife Diversity Funding Initiative would give birdwatchers, hikers, and photographers an opportunity to help hunters and anglers foot the bill for fish and wildlife conservation programs.

WILDLIFE PROFESSIONALS HONORED

During its annual meeting in Billings last February, the Montana Chapter of The Wildlife Society presented its Distinguished Service Award to Dr. Bart W. O'Gara, retired leader of the Montana Cooperative Wildlife Research Unit. The Montana Chapter, composed of over 350 professional wildlife biologists in the state, presents this award annually to a wildlife professional who has demonstrated outstanding achievements and contributions to the wildlife profession.

Dr. O'Gara became assistant leader of the Cooperative Wildlife Research Unit at the University of Montana in 1968 and leader in 1978, a position he held until his retirement in 1992. During his career at UM, Bart chaired 88 graduate student committees and served on many others. Under the auspices of the U.S. Fish and Wildlife Service, he also advised and lectured on wildlife management in Nepal, Pakistan, China, and Taiwan. He recently coordinated the establishment of a Sister Institution relationship between the University of Montana and the Northwest Plateau Institute, Xining, China. Bart is well known for his research and publications on the pronghorn, and is nearing completion of a book on this species.

Also at the Billings meeting, the Montana Chapter presented the Biologist of the Year Award to Mike Fox of the Fort Belknap Indian Reservation, and the Bob Watts Wildlife Communications Award to Vince Yannone of Montana Fish, Wildlife & Parks. Fox was recognized for his achievements in developing a successful wildlife management program that has not only provided significant financial benefits for the reservation but has restored wildlife and demonstrated how a sound hunting and fishing program can help maintain ecosystems. Yannone, who retires this month, was honored as "Montana's greatest wildlife ambassador" for communicating the wildlife message through his popular educational programs across the state over the past 25 years.—*Dennis Flath, nongame coordinator, FWP Region 3 (Bozeman)*

EDUCATIONAL TRUNKS AND TALKING BOOKS AVAILABLE

I remember climbing up that long flight of stairs with my brother to reach grandma's attic many, many times. Oh, the excitement of lifting the heavy lid of her huge, brown trunk to see what treasures grandma had put there for us to enjoy this time! We learned a lot about our world from the items in that old trunk. The who, what, why, when, where, and how of many of the things that exist both near and far on our planet. The contents of the trunk also taught us things like sharing, caring, and carrying on tradition. I can't help but wonder what ever became of it—perhaps some other youngsters stand in awe as that big, old lid is lifted and magic and imagination engulfs their beings.

To provide hands-on educational experiences for young Montanans, Montana Fish, Wildlife & Parks, the Montana Environmental Education Association, and other cooperating groups have assembled 56 educational trunks available to anyone wanting to teach—or learn—through the story of a trunk presentation. Topics for which trunks are available include air quality, archaeology, astronomy, bats, bears, bighorn sheep, bison, birds, dinosaurs, elk, endangered species, fish, frontier life/military, furs, history, Indians, insects, mining, mammals, marine topics, moose, mountain goats, natural resources, owls, pictographs, pond and prairie ecosystems, space/energy, trees, wolves, and water resources. A complete list will be sent to anyone submitting a request to Montana Fish, Wildlife & Parks, 1420 East Sixth Ave., Helena, MT 59620. Each entry on the list includes the topic of the trunk, the grade levels the trunk is designed for, the person to contact, and the cost of leasing the materials (if any). In most cases, the only expense is the cost of shipping.

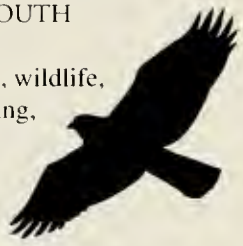
Talking books are also available in Montana for anyone to use. The audio cassettes are free of charge from the Montana State Library (call toll free, 1-

DEBBIE CHEEK

Fifty-six educational trunks are available to anyone wanting to teach—or learn—through use of a trunk presentation.

800-332-3400). All issues of *Falcon* (a youth conservation magazine) from its inception in 1993 and issues of *Montana Outdoors* from the past two years are available on audio cassettes. Many volunteers contribute their time and reading talents for this worthwhile program.—*Debbie Cheek, field support supervisor, Parks Division, Helena*

Dates Set for Natural Resources Youth Camp



What do water, wildlife, mining, river rafting, great meals, and campfire singing have in common? Where can you learn about forestry, range, and wildlife? They're all at the Montana Natural Resources Youth Camp for high school students held each year at Lubrecht Forest, 35 miles northeast of Missoula.

The award-winning camp, held this summer from July 30 to August 5, is taught by a team of more than 20 resource professionals and educators. Vince Yannone from Montana Fish, Wildlife & Parks will present a wildlife program one evening, and Ron Therriault of the Confederated Salish and Kootenai Tribes will discuss Native American attitudes toward natural resource management another evening.

More than 50 individuals, government agencies, companies, organizations, and professional societies throughout Montana contribute to the camp, including the Department of State Lands, Department of Natural Resources and Conservation, Montana Fish, Wildlife & Parks, Department of Health and Environmental Sciences, Bureau of Land Management, U.S. Forest Service, Stone Container, Society of American Foresters, Rocky Mountain Elk Foundation, and others.

The camp, now in its ninth year, received the U.S. Forest Service Natural Resources Conservation Education Award in 1991, and Take Pride In America awards in both 1990 and 1991.

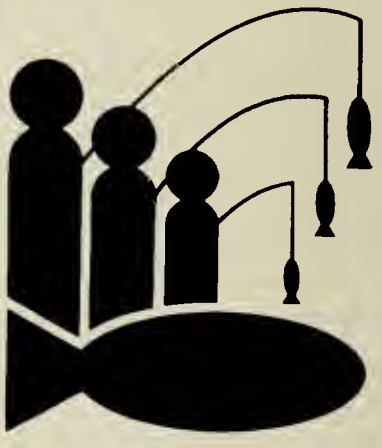
The full cost of the camp is $175, which includes room, board, instruction, and camp supplies. Campers pay $75 and camp sponsors provide the remainder of the fee. Information and applications can be obtained by contacting: Craig McCollim, Youth Camp Director; 1753 Moffitt Gulch Road; Bozeman MT 59715.

WYNDE CHEEK

DENNIS FLATH

"You don't have to be an adult to volunteer," says Wynde Cheek, who was aided in a recent study of turtles at Spring Meadow Lake State Park by several Helena-area youngsters. "The kids playing at the lake would be curious about what I was doing—when they found out I was catching turtles, they'd volunteer their services." Cheek, too, is a volunteer of sorts. An honors student in biology and sociology, she recently completed a seven-month study of Spring Meadow Lake's turtles as part of her requirements for graduation at Carroll College. "Spring Meadow has a healthy population of painted turtles," says Cheek, who estimated the lake's population of adult turtles at 74. "Turtles are the oldest living vertebrates, dating back 200 million years. The more we know about them, the better we can ensure their survival."

TAKE A FRIEND FISHING



NATIONAL FISHING WEEK JUNE 5-11, 1995

Montana State Parks Calendar

May

Educational Programs for Grades K-6 at Lone Pine State Park

First of May through June 15. Call 755-2706 for details.

Motorboat Testing at Lake Elmo State Park

Opportunity for motorboat owners to test engines for the upcoming summer. Testing will be done the first four weekends in May.

6—Buzzard Day at Makoshika State Park

Fun runs, "turkey shoot," and many activities for the whole family.

13—Bannack State Park Visitor Center Opens

Hours are 10:00 a.m. to 6:00 p.m.

13—KiteFest at Frenchtown Pond State Park

Call 542-5500 for details.

17-19—Spring Meadow Lake State Park Field Days

Fifth-grade school classes come to Spring Meadow to learn about natural resources. Call 444-4720 for details.

20—Bannack Senior Citizens Day

Call 834-3413 for details.

27—Lecture Series Begins at Bannack State Park

Saturday night lecture series features a variety of historical, recreational, and natural resource topics. Lectures begin at 7:00 p.m. Call 834-3413 for a list of topics.

June

3—Grand Opening of Remodeled Visitor Center at Lewis and Clark Caverns

23—Roe River Day at Giant Springs State Park

A special day of fun activities designed for children.

23-25—Lewis and Clark Encampment at Giant Springs State Park

A variety of historical activities for all ages. Live interpretation of the portage around Great Falls. Call 454-3441 for details.

23-25—"Hands Across History" at Headwaters State Park

30—Lecture Series Begins at Lewis and Clark Caverns State Park

Friday night lecture series features a variety of historical, recreational, and natural resource topics. Lectures begin at 8:30 p.m. Call 287-3541 for a list of topics.

July

4—Fort Owen Day at Fort Owen State Park

Ceremony and celebration to commemorate Montana's first permanent white settlement in 1841. Call 542-5500 for details.

15—Spring Meadow Lake State Park Triathlon

Biking, running, and swimming. Call 444-4720 for details.

15-16—Bannack Days at Bannack State Park

History comes alive in this celebration of the Montana frontier. Activities include pioneer skill demonstrations, old-time music and food, old-fashioned melodramas and skits, wagon rides, gold panning, dancing, mountain men, and more.

22—Kids' Day at Spring Meadow Lake State Park

This special day of activities for children includes bicycle safety, flyfishing and spincasting, water safety, birdwatching techniques, games, prizes, and food.

22-23—Ninth Annual Jordan/Hell Creek Walleye Tournament

$170 per team, limit of 125 teams. Call 228-9347 or 232-4365 for details.

23—Seniors' Day at Spring Meadow Lake State Park

A special day of fun activities for senior citizens.

29—Beach Games at Lake Elmo State Park

A variety of fun and crazy sports events held on the beach of Lake Elmo. Activities include the keg toss, canoe race, football toss, paddleboat races, games, prizes, and food. Call 252-4654 for details.

August

5—Third Annual Youth Fishing Tournament at Hell Creek State Park

Limited to children 5 to 13 years of age. A $10 entry fee includes lunch and T-shirt. Call 232-4365 for details.

12—Garden City Triathlon at Frenchtown Pond State Park

Swim, bicycle, and run beginning and ending at the park. For further information call 542-5500.

12—Spring Meadow Lake State Park Bat Watch

Beginning at dusk, the Last Chance Audubon Society sponsors an educational program on bat ecology and behavior. Call 444-4720 for details.

18-19—Dinner Theater in the Park at Makoshika State Park

An outdoor dinner followed by a play in the park. Call 365-6256 for details.

19—Second Annual Women's Jackpot Walleye Tournament at Hell Creek State Park

$20 per team, limit of 50 teams. Call 232-4365 for details.

26—Tour of the Night Skies at Frenchtown Pond State Park

Tour the universe with the Western Montana Astronomical Association. Call 542-5500 for details.

September

26-30—Native American Awareness Week at Chief Plenty Coups State Park

Activities for all ages focusing on Native American culture, history, and dress.

RECORDS FALL FAST IN 1994

THE POETS SAY IT'S BETTER to have loved and lost than never to have loved at all, so maybe it's better to have held a state fishing record for a few days than never to have landed that lunker in the first place. At least that's *some* consolation for **Tina Cruz** of Whitefish, who caught a 2.75-pound Arctic grayling in northwestern Montana's Sylvia Lake last May 9, breaking the existing record of 2.66 pounds set in 1986.

Flyfishing from a float tube with a No. 10 black leech, Cruz said she was overwhelmed when she saw the fish. "I knew the fish was big, and I just wanted to get it in to see it. It seemed to take forever to get him in. I just started shaking after I landed it—shaking and yahooing."

Then, a few weeks later, came the bad news-good news letter from FWP's Jim Vashro, fisheries manager in the Kalispell region:

Dear Tina:

You're not going to believe this.

A 3.21-pound grayling was caught from Handkerchief Lake on Tuesday, May 17. Your record lasted only eight days, one of the shorter spans on record.

The good news is that you still caught a dandy grayling. And a state record certificate is on its way to you to attest that for a while you were the top grayling angler in the state....

The Handkerchief Lake grayling, caught by **Frederick C. Dahl** of Columbia Falls, weighed in at 3.21 pounds, besting Cruz's fish by almost half a pound.

Speaking of records falling at warp speed, how about 11-year-old **Darwin Zempel, Jr.**, of Ravalli, who broke the black bullhead record three times—all in the same day? His letter from Fisheries Manager Vashro was strictly of the "good news" variety:

Dear Darwin:

Congratulations on your state record black bullhead....I understand all three of the bullheads you caught that day [April 4] broke the state record....Those are much bigger bullheads than I've ever caught and I'm envious....

Darwin's bullheads were taken in the lower Flathead River using chicken liver as bait. The biggest measured 15.5 inches and weighed 2.33 pounds, but all three bested the previous record of 1.95 pounds.

Eastern Montana, too, weighed in with its share of whoppers in 1994. The sauger record, like the grayling record, was broken twice in 1994—both times by fish from Fort Peck Reservoir. On May 12, **Karl Reddies** of Glasgow landed an 8.42-pound sauger, besting the previous mark of 8.28 pounds. Then on December 12, **Gene Moore** of Fort Peck answered the challenge with a fish weighing 8.81 pounds.

Darwin Zempel, Jr., broke the black bullhead record three times, all in the same day.

Three additional fish records fell in 1994: **Richard Liesener** of Ray, North Dakota, arrowed a 32.63-pound smallmouth buffalo in Nelson Reservoir, eclipsing the previous mark of 10.25 pounds; **Craig D. Grassel** of Williston, North Dakota, took a 57.75-pound bigmouth buffalo from the same water, edging last year's record entry of 53.50 pounds; and **Dan Dupea** of Billings caught a 27-pound tiger muskellunge in Lebo Lake, shattering the 1993 record of 18.64 pounds.

We added a new fish to our records list in 1994: the Flathead chub. According to George C. Holton's *A Field Guide to Montana Fishes*, the Flathead chub is a silvery fish in the minnow family found primarily in turbid rivers and streams of eastern Montana. **Kody Gilge** of Chinook caught his 1.89-pound specimen last August on a worm in the Missouri River near Fred Robinson Bridge.

What should you do if you think you've caught a record fish? First, you must catch the fish legally. Second, you must weigh your fish before witnesses on a government-inspected scale such as those found in most grocery stores. Weighing it as soon as possible is a good idea, since fish rapidly lose the precious ounces that can spell the difference between a record and a runner-up. Third, an FWP employee must positively identify the fish. It's also a good idea to take color photos of the fish to help resolve any identification problems.

Last, you can hope the letter you get from your friendly fisheries manager is strictly good news, and not one telling you that your fishing record held for only a week!—*Dave Books*

Montana's Record-Setting Fish (1994)

Species	Weight	Angler	Year	Location
Arctic grayling*	**3.21 lbs.**	**Frederick C. Dahl**	**1994**	**Handkerchief Lake**
Bigmouth buffalo*	**57.75 lbs.**	**Craig D. Grassel**	**1994**	**Nelson Reservoir**
Black bullhead*	**2.33 lbs.**	**Darwin Zempel, Jr.**	**1994**	**Lower Flathead River**
Black crappie	3.13 lbs.	Al Elser	1973	Tongue River Reservoir
Blue sucker	11.46 lbs.	Doug Askin	1989	Yellowstone River (near Miles City)
Bluegill	2.64 lbs.	Brent Fladmo	1983	Peterson's Stock Dam
Brook trout	9.06 lbs.	John R. Cook	1940	Lower Two Medicine Lake
Brown trout	29.00 lbs.	E.H. "Peck" Bacon	1966	Wade Lake
Bull trout	25.63 lbs.	James Hyer	1916	unknown
Burbot (ling)	17.08 lbs.	Jeff E. Iwen	1989	Missouri River (near Wolf Point)
Carp	38.50 lbs.	Don Bagley	1986	Eyraud Lakes
Channel catfish	25.89 lbs.	Gordon Wentworth	1984	Fort Peck Reservoir
		Tom Hilderman (tie)	1988	Fort Peck Reservoir
Chinook (king salmon)	31.13 lbs.	Carl L. Niles	1991	Fort Peck Reservoir
Cisco	1.46 lbs.	Jim Liebelt	1990	Dredge Cut Trout Pond
Coho salmon	4.88 lbs.	Irven Stohl	1973	Fort Peck Reservoir
Cutthroat trout	16.00 lbs.	William D. Sands	1955	Red Eagle Lake
Flathead chub**	**1.89 lbs.**	**Kody Gilge**	**1994**	**Missouri River (Fred Robinson Bridge)**
Freshwater drum	20.44 lbs.	Richard C. Lee	1987	Fort Peck Reservoir
Golden trout	4.90 lbs.	Carl Radonski	1993	Lightning Lake
Goldeye	2.91 lbs.	Vance "Bubba" Kielb	1989	Irrigation canal (west of Malta)
Green sunfish	0.56 lbs.	Roger Fliger	1991	Castle Rock Reservoir
Kokanee (salmon)	5.94 lbs.	Forrest Johnson	1976	Pishkun Reservoir
Lake trout	42.00 lbs.	Dave Larson	1979	Flathead Lake (east shore)
Lake whitefish	10.00 lbs.	Ruby Mutch	1986	Lower St. Mary Lake
Largemouth bass	8.16 lbs.	Juanita A. Fanning	1984	Milnor Lake
Longnose sucker	3.27 lbs.	Ray Quigley	1988	Marias River
Mountain whitefish	5.09 lbs.	Mervin "Frog" Fenimore	1987	Kootenai River
Northern pike	37.50 lbs.	Lance Moyler	1972	Tongue River Reservoir
Northern squawfish	7.88 lbs.	Darrel Torgrimson	1991	Noxon Rapids Reservoir
Paddlefish	142.50 lbs.	Larry Branstetter	1973	Missouri River
Peamouth	0.64 lbs.	Gordon Stewart	1991	Ashley Creek
Pumpkinseed	0.95 lbs.	Tim Colver	1985	Milnor Lake
Pygmy whitefish	0.16 lbs.	Orlin Iverson	1982	Ashley Lake
Rainbow trout	29.02 lbs.	Stanley Ross	1991	Kootenai River (David Thompson Bridge)
Rainbow-cutthroat hybrid	30.25 lbs.	Pat Kelly	1982	Ashley Lake
River carpsucker	3.50 lbs.	James Jessen	1991	Yellowstone River near Terry
Rock bass	0.57 lbs.	Don Holzheimer	1989	Tongue River Reservoir
Sauger*	**8.81 lbs.**	**Gene Moore**	**1994**	**Fort Peck Reservoir**
Shorthead redhorse sucker	4.68 lbs.	Ray Quigley	1985	Marias River near Loma
Shortnose gar	3.06 lbs.	John Johnson	1977	Fort Peck dredge cuts
Shovelnose sturgeon	13.72 lbs.	Sidney L. Storm	1986	Missouri River
Smallmouth bass	6.09 lbs.	Terry L. Druyvestein	1990	Fort Peck Reservoir
Smallmouth buffalo*	**32.63 lbs.**	**Richard Liesener**	**1994**	**Nelson Reservoir**
Stonecat	0.42 lbs.	Robert M. Garwood	1985	Milk River at Havre
Tiger muskellunge*	**27.00 lbs.**	**Dan Dupea**	**1994**	**Lebo Lake**
Utah chub	1.81 lbs.	Eugene Bastian	1992	Canyon Ferry Reservoir
Walleye	14.88 lbs.	Duane A. Leidholt	1989	Yellowstone River (near Miles City)
White bass	1.13 lbs.	Ludwig Dubbe	1986	Fort Peck dredge cuts
White crappie	2.38 lbs.	Greg Johnston	1990	Tongue River Reservoir
White sturgeon	96.00 lbs.	Herb Stout	1968	Kootenai River
White sucker	5.33 lbs.	Fred Perry	1983	Nelson Reservoir
Yellow bullhead	0.72 lbs.	Wade Fredenberg	1987	Yellowstone River
Yellow perch	2.37 lbs.	Vernon Schmid	1988	Ashley Lake

***New Montana record for 1994** ****New to Montana's record list**

POOLING RESOURCES

TO PRESERVE THE PAST

by John Taillie
Maintenance Worker
Parks Division, Region 3

One way Montanans and their guests can enjoy the state's fascinating history is by visiting sites containing historical buildings and structures that remind us of former inhabitants. Who doesn't enjoy poking around an old, abandoned dwelling, speculating over the previous occupants, why they constructed a building a certain way, or what a particular room was used for?

Montana Fish, Wildlife & Parks (FWP) manages and maintains a large number of historical buildings that are open to the public, including an entire ghost town at Bannack State Park, Gillian and Fraternity Halls at Elkhorn, Chief Plenty Coups' house at Chief Plenty Coups State Park, the Gallatin Hotel at Missouri Headwaters State Park, and others. Because many of these structures suffer from a variety of ills, primarily as a result of age and weathering, they frequently need repair as well as routine maintenance. It is important that these buildings be maintained using methods that do not compromise their historical significance or alter their character-defining aspects, which are, after all, what makes them unique.

The work performed on these old buildings is called historic preservation maintenance, and it covers a wide variety of treatments, ranging from reglazing a window to replacing sill logs. The basic philosophy is to keep the building's historic appearance intact by repairing rather than replacing whenever possible, and, when replacement is necessary, matching the existing fabric of the building using the same materials and techniques used in the original construction. This process sounds straightforward enough, but gray areas often emerge when decisions need to be made as to the proper treatment.

To gain experience and expertise in historic preservation maintenance, in the past few years FWP has enlisted the help of a team of historic preservation specialists from the U.S. Forest Service's Region 1 headquarters in Missoula. This team, composed of Bill Harris, Cary King, Dale Swee, and team leader Bernie Weisgerber, has worked on an impressive number of historical buildings in Montana, mostly on federal land. Jon Hoerning, FWP maintenance worker from Bannack State Park, and I began an association with the crew in April of 1992, when we assisted them on log work at the Judith Guard Station, a historic Forest Service ranger station located near Stanford.

From this first project a cooperative training effort arose in which the preservation team utilizes personnel, like Jon and me, from outside the Forest Service; in return, team members pass along their expertise as the work progresses. This effort now involves participants from many different national forests, the National Park Service, the Bureau of Land Management, and the state of Montana, as well as local volunteers. Since that first project at the Judith Guard Station, four official training projects have been conducted by the preservation team, each one focusing on a particular aspect of preservation work designed to give the participants a well-rounded perspective on historic building maintenance.

The first project, which involved wood shingle and shake roofing, took place at the Nine-Mile Remount Station outside of Missoula on a large barn originally constructed by the Civilian Conservation Corps and now utilized by the Forest Service as a maintenance shop. Eighty squares of cedar shingles were applied by the participants in this project.

The second project concentrated on log repair and replacement, and took place at the spectacular setting of the Hornet Fire Tower Lookout just west of Glacier National Park in the Flathead

JOHN TAILLIE

JOHN TAILLIE

With the benefit of training from a U.S. Forest Service historic preservation team, FWP has begun a maintenance program for historic buildings at park sites around the state. At a workshop held at Bannack State Park last June, participants completely redaubed two log buildings in two days.

National Forest. Five tons of tools, equipment, and materials were flown in by helicopter due to the site's inaccessibility by vehicle.

Third in the training series was window and door repair and replacement at the National Park Service's Grant-Kohrs Ranch outside of Deer Lodge.

The fourth and most recent workshop, which took place at FWP's Bannack State Park in October of 1994, covered historic structure investigation and project planning. It was attended by people from as far away as Washington, D. C., Alaska, and New Mexico, and involved the State of Montana, U.S. Forest Service, National Park Service, Bureau of Land Management, Montana State Historic Preservation Office, TW Recreational Services of Yellowstone National Park, and two historic architects.

With the benefit of the training workshops and help from the Forest Service team, FWP has begun its own program of historic preservation maintenance in Region 3 (Bozeman). To date we have reroofed five buildings and repaired and reglazed many windows in buildings at Bannack State Park while maintaining the look and feel of the colorful ghost town's past. Jon Hoerning and I also conducted a workshop at Bannack in June of 1994 on daubing log buildings (also called chinking). Participants at this workshop volunteered their time and almost completely redaubed two log buildings in two days. Another project involved stabilizing the Gallatin Hotel at Missouri Headwaters State Park to prevent its collapse. In this project, it was necessary to construct an internal frame to actually hold up the existing historic hotel.

We plan to continue cooperating with the historic preservation team and pooling our resources with other agencies whenever possible as work proceeds on historic buildings around the state. In these times of reduced work forces and lean budgets, interagency cooperation may hold the key to preserving this important element of Montana's heritage for future generations to enjoy.

Readers Respond

Special Photo Issue Captures Meaning of Montana Outdoors

When I by chance happened to pick up a copy of your Special Photo Issue while browsing in a bookstore, I was immediately remorseful that I had allowed my subscription to *Montana Outdoors* to expire a few years back. I was so excited by this issue that I purchased three copies for friends and then renewed my own subscription along with purchasing two out-of-state subscriptions for family members.

From photos of the American avocet, black bear, and gray goose to the red fox, ring-necked pheasant, and baldpate widgeon, I was reminded that they and many other species had been welcome "trespassers" on the Steindorf Homestead this past year. This collection of wildlife photos, along with the scenic, hunting, fishing, and rafting, so superbly captured what Montana Outdoors means to me.

My excitement for your publication continued when I saw your article "Pheasant Heaven" in the March/April edition. You see, the 40-acre place I live on, homesteaded in 1910 by my grandfather, is adjacent to part of the Ninepipe Wildlife Management Area just two miles south of Ninepipe Reservoir. Having lived here most of my 44 years (gone long enough to realize I had grown up in "heaven" compared to most other places), I can attest that this area hasn't always been "pheasant heaven." I have been an avid bird hunter since I was old enough to tote a 12-gauge shotgun and I remember years that if I was able to connect with two or three pheasants the entire season I was doing well. I feel that the skunk trapping program that Joe Ball talks about in the article along with other management improvements have really paid off for the bird populations.

Anyway, they must be doing something right. This past hunting season I was able to connect with 15 pheasants just on my own place. I regularly can count 75 to 100 pheasants feeding in my 20 acres of grain stubble. Keep up the good work FWP and thanks for a truly great publication that keeps us informed and inspired to make Montana outdoors even better.—*David Steindorf, Charlo*

Per my telephone call to you last week, enclosed is my check for ten copies of the Special Photo Issue. The pictures are breathtaking, and Mike Logan's rhyme adds just the right touch to make this an outstanding issue.

Your description of Mike Logan had special meaning for me, because my husband, who passed away just a little over a year ago, was also a "big man with a big heart." He loved hunting and the outdoors and would have enjoyed this issue very much. I am giving these copies to some of his closest friends who also appreciate nature. I am sure this issue will be very special for them as well.

Thank you for your assistance, and a special "thank you" to everyone involved in the publication of your magazine.—*Janet P. Caves, Stockton, California*

Gardiner Veterans Reminisce

I would like to take this opportunity to let you know that I thoroughly enjoyed your write-up in the March/April issue of *Montana Outdoors* on the Gardiner elk hunts. The large picture on pages 2 and 3 is especially interesting, because I remember the headquarters building very clearly and I knew Joe Gaab quite well. Also, the man to his right on horseback is, I am just about 100% positive, Red Burke, who was a game warden in Park County for many years. I also know Joe Lawellin and met the Hoppes many years ago, so you can understand why this is especially interesting to me.

I was born and raised on a ranch at Clarkston, Montana, north of Logan and then went to work on the Northern Pacific Railroad at Livingston in 1941. My first elk was killed on Deckard Flats in 1937 with a 25-20 rifle that was borrowed from a neighbor—so you can see that I am quite familiar with those old days of the Gardiner hunts as well as the "firing line."

I could go on and on with tales of the hunts back then, but wanted to let you know about Red.

Thanks for the enjoyment I got from this article.—*Ted Rohla, Whitefish*

You are correct that the horseman at far right in the photo is John "Red" Burke, a game warden who was based in Livingston. The men standing in the doorway at Joe Gaab's left are Warden Captain Gene Sherman (holding the coffee cup) and former Montana Fish and Game Department director Bob Lambeth.—Editor

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Reading the March/April issue of *Montana Outdoors* brings to mind my one hunting trip to Gardiner in the 1947-1948 season. It was minus 25 degrees, maybe a 25-30 mile-per-hour wind, and about 18 inches of crusted snow that just wouldn't support your weight. Myself and Don Stonehacker from Three Forks, Montana, were behind some boulders in Travertine Quarry waiting for the siren to blow, while 23 head of elk went within eight feet of us. The siren blew but the elk had just gone out of sight of the quarry. After the shooting was finished we went up on the bench. There was a hunter on crutches and I asked him if he had gotten an elk.

He stated no, he had to get behind some brush and trees to not get run down. I said it must be tough getting around in that crusted snow. He stated it was very hard walking, and that he had been shot through both hips, and crippled for life, four years before while trying to put the old style metal tag on his elk. He further stated he knew who did it and someday he would find him and get even.

That was my one and only trip to Gardiner. Too dangerous for me.—*Rod Kulstad, Stevensville*

CONTRIBUTORS

Auchly

"Aquatic education lets people discover what lies beyond the water's edge," says **BRUCE AUCHLY** in his article beginning on page 2. "Getting youngsters into fishing ranks high, but the program has other features as well. Whether it's teaching youngsters to tie flies or checking a river's temperature and pH, the program has rewards for people of all ages." Auchly is FWP's information officer for Region 4 (Great Falls).

Montana anglers traditionally look forward to the third Saturday in May, the opening of fishing season in most of the state's trout waters. But, as **DAVE CARTY** points out, high, roily water, sluggish fish, and crowds can sometimes pose problems. In "Fishing the Opener" (p. 6) he describes how two expert Montana anglers consistently catch their share of trout during this unpredictable time of year. Carty is a Bozeman-based free-lancer who does as much research as possible on the river with flyrod in hand.

"Have Secchi Disk, Will Travel" (p. 10) is the motto of more than 100 volunteers across Montana who are helping state and federal agencies establish water quality baselines for lakes and streams, says **JOHN FRALEY**. "Volunteers use a device called a Secchi disk to indicate algae blooms, lake turbidity, and general lake productivity. They also measure variables like total phosphorus content and water temperature." Fraley, who is FWP's information officer in Region 1 (Kalispell), wishes to thank Loren Bahls, Mark Holston, John Wachsmuth, Gina Morrison, and Marilyn and Gil Alexander for help in preparing his article.

Flath

Did you know that frogs were among the first vertebrates to live on land? And that snakes have dry, scaly (rather than slimy) skin to protect them from dehydration? As **JIM REICHEL** and **DENNIS FLATH** point out in a special 20-page guide to "Identification of Montana's Amphibians and Reptiles" (p. 15), there is much to be learned—even by experts—about the 30-plus species of salamanders, frogs, toads, snakes, lizards, and turtles known to live in Montana. Reichel is a zoologist with the Montana Natural Heritage Program in Helena, and Flath is FWP's nongame coordinator stationed at the Region 3 headquarters in Bozeman.

Reichel

According to **MIKE HATHAWAY**, Hell Creek State Park is somewhat of a misnomer. While he concedes that the badlands country north of Jordan can be a bit "hellish" on a hot summer day, this "Gateway to the Breaks" (p. 31) is a paradise for hikers, anglers, hunters, and wildlife watchers. Whether you're drawn to the excellent fishing in Fort Peck Reservoir, or the hunting on nearby C.M. Russell National Wildlife Refuge, Hell Creek State Park makes a good jumping off point for a Missouri breaks adventure. Hathaway is a park operations specialist in FWP's Region 7 (Miles City) office.

Through federal taxes on equipment they purchase, hunters and anglers pay millions of dollars each year for wildlife conservation. Recently, say **NELS RODEFELD** and **BETSY SPETTIGUE**, the International Association of Fish and Wildlife Agencies (IAFWA)—a group representing fish and wildlife agencies from all 50 states, Mexico, and Canada—has proposed a way for birdwatchers, hikers, photographers, and other outdoor enthusiasts to share in the cost. To learn more about the Wildlife Diversity Funding Initiative, turn to "We're All in This Together" on page 39. Rodefeld is a publications specialist with the Oklahoma Department of Wildlife Conservation, and Spettigue coordinates FWP's Watchable Wildlife Program in Helena.

MO thanks the following photographers for their contributions to this issue: **RICK & NORA BOWERS**, Tucson, AZ; **MILO BURCHAM**, and **MICHAEL J. WOLF**, Missoula; **CANYON FERRY LIMNOLOGICAL INSTITUTE**, **WYNDE CHEEK**, **LEE GRAVES**, and **DONITA SEXTON**, Helena; **LOWELL DILLER**, Korbel, CA; **KRISTI DUBOIS**, Bountiful, UT; **PHIL FARNES**, and **DUSAN SMETANA**, Bozeman; **GEOFFREY HAMMERSON**, Boston, MA; **JEFF & ALEXA HENRY**, Emigrant; **MARK HOLSTON**, and **BILL SWANSON**, Kalispell (Bill Swanson extends a special thanks to 13-year-old **CHRISTOPHER BURTCH** of Kalispell, whose knowledge of reptiles and amphibians and their haunts made possible several of his photographs); **DONALD M. JONES**, Troy; **WELDON LEE**, Allenspark, CO; **KEN MILLS**, Three Forks; **ALAN G. NELSON**, and **RODNEY SCHLECHT**, Great Falls; **JAMIE OGOLIN**, Miles City; **LURAY PARKER**, Cheyenne, WY; **CHARLES R. PETERSON**, Pocatello, ID; **KLAUS O. RICHTER**, Kirkland, WA; **PATRICK TOALSON**, Daphne, AL; **AL TROTH**, Dillon; **KIRWIN WERNER**, Ronan; and **ALLEN WIEDERRICH**, Crane. Thanks also to the following contributors who work for the department: **DEBBIE CHEEK**, and **MIKE GURNETT**, Helena; **DAVID CONKLIN**, and **John Fraley**, Kalispell; **DENNIS FLATH**, and **JOHN TAILLIE**, Bozeman.